Removing the "High" from the Highways: The Impact of Virginia's Efforts To Combat Drug-Related Driving Under the Influence

JACK D. JERNIGAN

Beginning on April 1, 1988, a revision to Virginia law gave police officers the authority to require an individual suspected of drug-related driving under the influence (DUI) to submit a blood sample to be tested for drugs. Concurrent with the implementation of the revised law, Virginia initiated a pilot Drug Recognition Technician (DRT) Program, which concentrates on training police officers to detect the signs of impairment consistent with seven broad categories of drugs. The impact of the revised law and the DRT program on arrests and convictions for drug-impaired driving between 1988 and 1990 was evaluated. In addition, the question of whether there was a spillover effect on alcohol-related arrests and convictions and alcohol-related injury and fatality rates was investigated. Drug-related DUI arrests increased in 1988 but declined somewhat in 1989 and 1990; however, the DUI conviction rate for drug-related cases remained relatively stable. Generally, if a drug was detected, the DUI conviction rate was 40 to 70 percent, depending on the type of drugs detected. If no drug was detected, the DUI conviction rate was less than 25 percent. Although the revised law encouraged officers to make more arrests for drug-related DUI, there is no evidence that it reduced fatalities. Further, even though the DRT program helped increase arrests for drug-related DUI, DRT cases were no more likely than non-DRT cases to result in a conviction. However, there is some evidence that the DRT program had a positive influence on the arrest rate for alcohol-related DUI.

Effective April 1, 1988, Virginia implemented a revised law that prohibits impaired driving. A key provision was that police officers can require an individual suspected of driving under the influence (DUI) to submit a blood sample to be tested for drugs even if an evidentiary breath test for alcohol has been administered. The results of the blood test can be used in court to corroborate an officer's testimony that the suspect had been using drugs and as a supplement to the officer's testimony of the evidence of the suspect's impaired behavior. However, drugs other than alcohol are so chemically complex, and their effects so varied among individuals, that currently there is no scientific way to relate blood drug concentration to blood alcohol concentration (BAC) or to impairment (*1*).

In preparing for the implementation of the revised DUI law, the Virginia Department of Motor Vehicles (DMV) and the Virginia State Police (VSP) established a task force. To supplement the revised law, a pilot Drug Recognition Technician (DRT) Program was established in several jurisdictions, which consisted of training officers to determine whether an individual had used a drug and the class of drug he or she had used. However, since enforcement of the revised statute was not limited to the pilot jurisdictions, a statewide program was developed. The Virginia Division of Forensic Science (DFS) developed and distributed statewide standardized regulations, procedures, forms, and information sheets concerning the submission of blood samples for individuals suspected of driving while impaired by drugs. The revised statute was publicized through a public information campaign. Several policy guidance memoranda were developed and sent to police agencies to encourage enforcement of the revised statute and clarify procedures for its effective use. An additional strategy was to train officers in the use of standardized field sobriety tests. Hence, the strategies mainly comprise an enforcement training program, albeit one supplemented by public information and education efforts.

Virginia Transportation Research Council, Box 3817 University Station, Charlottesville, Va. 22903-0817.

LITERATURE REVIEW

Studies of DUI countermeasures involving enforcement have generally found that such efforts can be effective. A number of studies found that enforcement efforts targeting DUI can significantly increase DUI arrests and reduce crash or fatality rates (*2–6*).

Other studies point to the precarious nature of the effectiveness of enforcement programs. Voas and Hause (*7*) found that nighttime crashes, a surrogate measure for alcohol-related crashes, decreased during the implementation of a nighttime DUI special enforcement program. However, the researchers pointed out that the effectiveness of the program was greatest in the early stages of its implementation.

Ross (*8*) investigated the success of the Europeans, particularly the Scandinavians, in deterring drunk driving and concluded that the deterrence effects of these models were not as effective as had been reported. Specifically, although legislative action and other deterrence efforts had an initial impact in reducing drunk driving and fatal crashes, the benefits were only for the short term. Although these countries have stricter laws and harsher penalties than the United States, Ross concluded that social norms are more likely to be at the

root of their success in deterring drunk driving—a conclusion echoed in a later, related monograph by Jacobs (*9*).

Liban et al. (*10*) examined a number of drunk driving countermeasure programs in Canada. They found that a number of community enforcement efforts were attempted but concluded that these efforts had a limited impact on reducing drunk driving. Furthermore, they concluded that the limited effectiveness was short lived.

In the United States, there are some indications that DUI countermeasures may affect fatalility rates, at least in the short run. Hingson et al. (*11*) related the flurry of media and public attention and legislative action focused on DUI in the early 1980s to the drop in fatal crashes between 1980 and 1985. However, they pointed out that this trend soon ended and was, in fact, reversed between 1985 and 1986.

Hingson et al. (*3*) studied the impact of legislation in Maine that made driving with a BAC of 0.10 percent or higher a per se violation of the state's DUI law. They concluded that the legislation did not have a lasting deterrent impact. One reason was that it failed to change drivers' perceptions that their chances of being apprehended and arrested for drunk driving had increased substantially subsequent to the implementation of the law.

PURPOSE AND SCOPE

The primary objective of the study was to determine the effectiveness of Virginia's program to combat drug-impaired driving, particularly the DRT program, in increasing arrests and convictions for drug-impaired driving and decreasing traffic injuries and fatalities. The scope of this evaluation was limited to Virginia's drug-impaired driving program. These data do not address the potential effectiveness of the DRT program as it might be implemented in other states. That is, the DRT program itself is limited by the laws of Virginia, which may differ from the laws of other states.

Arrests examined in this investigation represent only those arrests in which an officer requested and collected a blood sample to be tested for drugs. Because alcohol- and drug-related DUI cases are charged under the same statute in Virginia, there is no way to separate them in the absence of a chemical test.

Another limitation of the study was that in Virginia, as in many states, driving with a BAC of 0.10 percent or higher as shown on an evidentiary breath or blood test is considered per se evidence of impairment. Since alcohol impairment and drug impairment are charged under the same statute, the presence or absence of drugs has little influence on the probability of a DUI conviction in cases with a BAC of 0.10 percent or higher (called high-BAC cases) because a DUI conviction is highly probable given the results of the blood or breath test for alcohol alone. To control for the potential conviction rate bias of considering high-BAC cases in the analysis, the researcher compared only suspected drug-related DUI cases in which either no alcohol was detected or the BAC was less than 0.10 percent (called low-BAC cases). In effect, this method ensured that conviction rates would not be elevated by case selection (i.e., by simply processing a greater number of high-BAC cases through the drug testing laboratory).

METHODOLOGY

If an officer requires a suspect to submit a blood sample, two vials of blood are drawn, normally within 2 hr of the offense, and one is sent to DFS for analysis. Virginia law provides that the second vial may, at the request of the suspect, be sent to an approved laboratory for independent analysis.

The vial that is forwarded to DFS is tested first for alcohol content. If the sample has a BAC level of 0.10 percent or higher, no additional tests are conducted unless a DRT was involved in the arrest. Radioimmunoassay (RIA) is used to screen the blood for evidence of drug use. Gas chromatography/mass spectrometry (GC/MS) is used to confirm all samples that were positive on RIA for any drug. A finding of drugs is reported only for samples that are positive for both RIA and GC/MS. A report of the test results is sent to the local court of jurisdiction.

Using the data collected by DFS, the only central source of information for drug-related DUI arrests, it is possible to track cases back to arrest and forward to resolution. Cases were tracked through at least one of two avenues. First, beginning in summer 1990, court records were checked to ascertain the judicial resolution of each case. Cases that had been resolved and were of record in the local office of the clerk of the court were tracked. Second, in a sample of cases, the arresting officer was contacted and questioned about the resolution of the case.

By cross-tabulations, low-BAC cases were analyzed to determine whether there was a significant relation ($p < .05$) between the year a sample was submitted to DFS and whether a DRT was involved in the case. This method was also used to examine the relation between the laboratory results and whether a DRT was involved in the case.

Next, the researcher examined the DUI conviction rate. DUI convictions included a few that were being appealed when the conviction data were collected. Convictions on non-DUI charges, including a lesser charge of reckless or improper driving, were not counted as DUI convictions but were considered as being resolved. Cross-tabulations were used to determine whether DRT involvement influenced the relation between the DUI conviction rate and (*a*) the year of submission to the DFS and (*b*) the laboratory results.

In addition, the researcher examined whether the emphasis placed on drug-impaired driving had a spillover effect on alcohol-related DUI arrests and convictions and alcohol-related injury and fatality rates. Rates were calculated for each jurisdiction per 1,000 licensed drivers. Using the *t* test, rates for 1986 were compared with the rates for 1990 (2 years before and after the enactment of the revised DUI law) to determine whether DRT and non-DRT jurisdictions differed significantly.

ANALYSIS

Arrests for Drug-Impaired Driving

Table 1 indicates that between April 1, 1988, and December 31, 1990, DFS received 1,199 low-BAC blood samples to be tested for drugs for DUI cases. Overall, 18.3 percent of the samples submitted to DFS between 1988 and 1990 involved

TABLE 1 Number of Drug-Related DUI Cases by Year Submitted to DFS: BAC < 0.10 percent*

TYPE OF CASE	1988	1989	1990	TOTAL
No DRT Involved	286 (74.3%)	350 (84.7%)	343 (85.5%)	979 (81.7%)
DRT Involved	99 (25.7%)	63 (15.3%)	58 (14.5%)	220 (18.3%)
TOTAL	385	413	401	1,199

*Significant at $p < .05$.

a DRT. In 1988, the first year in which the revised law was in effect, DRTs were involved in 25.7 percent of all samples received by DFS; by 1990, this percentage had dropped to 14.5. This decline was statistically significant. In addition, even though the revised DUI law was in effect for only 9 months in 1988, there were more low-BAC DRT submissions in that year than in either of the 2 subsequent years.

Table 2 indicates that there is a significant relation between whether a DRT was involved in a case and the type of drug that was detected. In particular, cases in which PCP was detected were vastly more likely to be non-DRT cases. Non-DRT cases were more likely to involve multiple drugs. Overall, drugs were detected in 64.6 percent of the samples; however, "no drugs detected" does not necessarily mean that there was no drug present. It is possible that a drug was present for which no test was available, a drug was present but at a concentration too low to be confirmed by DFS (e.g., the dosage level of LSD is too low to be confirmed), or a drug was present at the time of the traffic stop but had metabolized or dissipated before the blood sample was taken.

Convictions for Drug-Impaired Driving

As seen in Table 3, there is a significant relation between the year the sample was submitted to DFS and the result of the case. The percentage of cases resulting in a DUI conviction was highest in 1988, declined in 1989, and declined further in 1990. Table 3 further indicates that the DUI conviction rate of DRT cases remained relatively stable, around 40 percent, but that the DUI conviction rate for non-DRT cases decreased from more than 50 percent in 1988 to less than 37 percent in 1990.

Table 4 indicates that there is a significant relation between the laboratory results and whether a case resulted in a conviction. If a drug was detected in the sample, the overall DUI conviction rate ranged from about 40 to 70 percent, depending on the drug detected. However, if no drug was detected and alcohol was detected at a level less than 0.10 percent BAC, there was less than a 25 percent DUI conviction rate. Finally, when neither drugs nor alcohol was found, less than 15 percent of the cases resulted in a DUI conviction.

Alcohol-Impaired Driving

Table 5 indicates that the alcohol-related DUI arrest rate for 1,000 licensed drivers overall and among the non-DRT jurisdictions declined significantly from 1986 to 1990. However, in the DRT jurisdictions, there was no significant difference in the arrest rates of 1986 and 1990. Table 5 also indicates that the average conviction rate for DRT jurisdictions in-

TABLE 2 Number of Drug-Related DUI Cases by Laboratory Result: BAC < 0.10 percent*

LABORATORY RESULT	NO DRT INVOLVED	DRT INVOLVED	TOTAL
Multiple drugs	193 (19.7%)	23 (10.5%)	216 (18.0%)
Marijuana	150 (15.3%)	48 (21.8%)	198 (16.5%)
PCP	160 (16.3%)	7 (3.2%)	167 (13.9%)
Cocaine	71 (7.3%)	16 (7.3%)	87 (7.3%)
Other drugs	79 (8.1%)	28 (12.7%)	107 (8.9%)
No drugs detected, low BAC	55 (15.8%)	50 (22.7%)	205 (17.1%)
No drugs detected, no BAC	171 (17.5%)	48 (21.8%)	219 (18.3%)
TOTAL	979	220	1,199

*Significant at $p < .05$.

TABLE 3 Drug-Related DUI Conviction Rate by Year Submitted: BAC < 0.10 percent

YEAR	NO DRT INVOLVED*	DRT INVOLVED	TOTAL*
1988	50.7% (n = 201)	40.5% (n = 84)	47.7% (n = 285)
1989	44.2% (n = 260)	38.0% (n = 50)	43.2% (n = 310)
1990	36.8% (n = 253)	42.4% (n = 33)	37.4% (n = 286)
TOTAL	43.4% (n = 714)	40.1% (n = 167)	42.8% (n = 881)

*Significant at $p < .05$.

TABLE 4 Drug-Related DUI Conviction Rate by Laboratory Result: BAC < 0.10 percent

LABORATORY RESULT	NO DRT INVOLVED*	DRT INVOLVED*	TOTAL*
Multiple drugs	61.3% (n = 142)	52.9% (n = 17)	60.4% (n = 159)
Marijuana	46.1% (n = 115)	71.4% (n = 35)	52.0% (n = 150)
PCP	69.3% (n = 114)	40.0% (n = 5)	68.1% (n = 119)
Cocaine	42.0% (n = 50)	71.4% (n = 14)	48.4% (n = 64)
Other drug	42.6% (n = 61)	30.0% (n = 20)	39.5% (n = 81)
No drugs detected, low BAC	23.4% (n = 111)	25.0% (n = 40)	23.8% (n = 151)
No drugs detected, no BAC	14.9% (n = 121)	13.9% (n = 36)	14.6% (n = 157)
TOTAL	43.4% (n = 714)	40.1% (n = 167)	42.8% (n = 881)

*Significant at $p < .05$.

TABLE 5 Average DUI Arrests and Convictions per 1,000 Licensed Drivers

Rate	1986	1990	% Change
Average DUI Arrest Rate			
Non-DRT Jurisdictions*	14.19	12.41	−12.5
DRT Jurisdictions	13.41	13.48	+ 0.5
All Jurisdictions*	14.16	12.46	−12.0
Average DUI Conviction Rate			
Non-DRT Jurisdictions	10.84	10.42	− 3.9
DRT Jurisdictions	11.45	12.19	+ 6.5
All Jurisdictions	10.87	10.50	− 3.4

*Significant at $p < .05$.

creased between 1986 and 1990, although the rates for non-DRT jurisdictions declined slightly. However, these changes in conviction rate were not statistically significant.

Table 6 indicates that the injury rate for alcohol-related crashes decreased significantly between 1986 and 1990 in both DRT and non-DRT jurisdictions. On the other hand, there was no significant change in the alcohol-related fatality rate between 1986 and 1990.

DISCUSSION OF RESULTS

Arrests for Drug-Impaired Driving

The number of blood samples to be tested for drugs for low-BAC cases declined from an average of more than 42 per month in 1988 to an average of fewer than 35 per month in 1989 and 1990. Thus, the number of cases that might have been pursued as a consequence of the revised law declined in the second and third years of the law's implementation, as did the average number of cases submitted by DRTs. These findings are consistent with the literature on enforcement programs. In particular, many enforcement efforts begin by moving toward accomplishing their goals, but the initial emphasis as well as the initial success begins to diminish.

In 1988, two chiefs of police were actively involved in developing the DRT program and in working with the task force; by 1990, no chief of police was actively involved. Instead, the program and its development had been allocated to lower administrative levels of the enforcement agencies involved.

In addition, there were initially two sergeants who were among the first to receive DRT training and were the leaders and chief salespeople for the DRT program. For differing reasons, both moved from their initial responsibilities in overseeing the program to other duties. Without these sergeants and the chiefs, the program lost much of its continuity and leadership.

At DMV, responsibility for this program moved from a level of involvement by relatively high management to a lower level of training coordinators. Hence, contact with police agencies came from the lower levels of the agency. Likewise, early in the program's development, there was a flurry of public information and education activity that had all but ceased by 1989.

Statewide, the task force sent out several policy guidance memoranda that were intended to inform officers about the revised law and provide suggestions for pursuing cases under the revised law. The last of five memoranda was sent out on March 7, 1989. The task force also held bimonthly or quarterly meetings in 1988 and 1989, but few have been held since.

No individual or agency is necessarily to blame for the drop in the number of submissions to DFS, the decline in activity, or the delegation of authority. Rather, the drop is characteristic of a program of this type running through a life cycle of enthusiasm to decline. As much of the literature points out, any success of an enforcement program is usually short lived. Much of the success of Virginia's DRT program seems to have likewise been short lived.

Convictions for Drug-Impaired Driving

Between 1988 and 1990, the conviction rate for non-DRT cases declined from more than 50 to less than 37 percent. Initially, conviction rates were higher for non-DRT cases than for DRT cases. On the other hand, DRT cases had a relatively stable conviction rate of about 40 percent throughout the 3 years. During the first 2 years, the differences between the conviction rates for DRTs and non-DRTs could largely be explained by the fact that most PCP cases were non-DRT cases (*12*). That is, a PCP case was more likely than any other case to result in a conviction. Hence, the existence of a substantial number of PCP cases in the non-DRT sample inflated the conviction rate for non-DRTs. When the DRT and non-DRT samples were made more comparable by consideration of only non-PCP cases, the difference in conviction rates was eliminated (*12*). Similarly, a drop in the number of PCP cases submitted by non-DRTs in 1989 and 1990 likely functioned to decrease the overall conviction rate for non-DRT cases simply because any other laboratory result was associated with a lower conviction rate than a finding of PCP.

Finally, although different laboratory results were related to different conviction rates, a laboratory result of "no drugs detected" was associated with a conviction rate of less than 25 percent.

Alcohol-Impaired Driving

Between 1986 and 1990, the alcohol-related DUI arrest rate per 1,000 licensed drivers for non-DRT jurisdictions declined significantly, but that for DRT jurisdictions remained stable. This indicates that there may have been a spillover effect of the DRT program on alcohol-related DUI arrests. That is,

TABLE 6 Average Alcohol-Related Injuries and Fatalities per 1,000 Licensed Drivers

Rate	1986	1990	% Change
Average Alcohol-Related Injury Rate			
Non-DRT Jurisdictions*	4.22	3.65	−13.5
DRT Jurisdictions*	4.59	3.49	−24.0
All Jurisdictions*	4.23	3.65	−13.7
Average Alcohol-Related Fatality Rate			
Non-DRT Jurisdictions	0.20	0.19	−5.0
DRT Jurisdictions	0.10	0.11	+10.0
All Jurisdictions	0.19	0.19	—

*Significant at $p < .05$.

by concentating some training and enforcement on drug-impaired driving, it is possible that the DRT jurisdictions helped fight off a decline in the DUI arrest rate in the non-DRT jurisdictions.

Although the DUI conviction rate per 1,000 licensed drivers for non-DRT jurisdictions declined and the rate for DRT jurisdictions increased, neither change was significant. Thus, there is no indication that either the revised law or the DRT program affected the DUI conviction rate as measured per 1,000 licensed drivers.

The alcohol-related injury rate per 1,000 licensed drivers was down in both DRT and non-DRT jurisdictions, but the decline was greater in DRT jurisdictions. Thus, the existence of the DRT program and the stable arrest rates for DUI may have decreased the alcohol-related injury rate in DRT jurisdictions. However, because there was not a significant change in the fatality rate, there is no evidence that the revised law or the DRT program had any impact on reducing traffic fatalities.

CONCLUSIONS

Between 1973 and 1984, there was an average of only 11 convictions per year for drug-related DUI in Virginia (*13*). Thus, the revised law was effective in increasing the absolute number of arrests and convictions for drug-related DUI. Furthermore, because DRTs make up less than 1 percent of the statewide enforcement strength and were involved in about 15 percent of the drug-related DUI cases, there is evidence that DRT training increased the level of law enforcement. In addition, because the alcohol-related DUI arrest rate remained stable in DRT jurisdictions and declined in other jurisdictions, there is evidence that the DRT program may have had a spillover effect on the enforcement of alcohol-related DUI.

However, there are some issues of concern about Virginia's efforts to combat drug-related DUI. The overall drug-related DUI conviction rate in both DRT and non-DRT jurisdictions is only about 40 percent, although the conviction rates for cases in which a particular drug (e.g., cocaine, marijuana, and PCP) was detected are higher. Thus, if the conviction rate is to increase, efforts are needed to strengthen many DRT and non-DRT drug-related DUI cases. There is no evidence that either the 1988 law or the DRT program functioned to decrease the fatality rate. Most disconcerting is the evidence of decline in even the positive measures of short-term success. Drug-related DUI arrests declined after 1988, and emphasis on enforcement and task force and public information and education activities has also diminished. It was concluded that, unless substantially revitalized, Virginia's efforts to combat drug-related DUI will continue to follow the path of decline that has plagued so many other enforcement programs.

REFERENCES

1. J. Mörland. Psychoactive Drugs and Driving Performance. *Proc., 35th International Congress on Alcoholism and Drug Dependence*, Vol. 3, National Directorate for the Prevention of Alcohol and Drug Problems, Oslo, Norway, 1989, pp. 401–409.
2. D. Foley. Case Study in DWI Countermeasures. In *Stop DWI: Successful Community Responses to Drunk Driving* (D. Foley, ed.), Lexington, Lexington, Mass., 1986.
3. R. Hingson, T. Heeren, D. Kovenoch, T. Mangione, A. Meyers, S. Morelock, R. Lederman, and N. Scotch. Effects of Maine's and Massachusetts' 1982 Driving Under the Influence Legislation. *American Journal of Public Health*, Vol. 77, 1987, pp. 593–597.
4. J. Lacey, L. Steward, L. Marchette, P. Popkin, R. Murphy, R. Luche, and R. Jones. *Enforcement and Public Information Strategies for DWI General Deterrence: Arrest Drunk Driving—The Clearwater and Largo, Florida Experience.* DOT Report HS 807 066. U.S. Department of Transportation, 1986.
5. G. Sykes. Saturated Enforcement: The Efficacy of Deterrency and Drunk Driving. *Journal of Criminal Justice*, Vol. 12, 1984, pp. 185–197.
6. R. Voas, A. Rhodinizer, and C. Lynn. *Evaluation of Charlottesville Checkpoint Operations.* DOT Report HS 806 989. U.S. Department of Transportation, 1986.
7. R. Voas and J. Hause. Deterring the Drinking Driver of the Stockton Experience. *Accident Analysis and Prevention*, Vol. 19, 1987, pp. 81–90.
8. H. Ross. *Deterring the Drinking Driver.* Lexington, Lexington, Mass., 1982.
9. J. Jacobs. *Drunk Driving: An American Dilemma.* University of Chicago Press, Chicago, Ill., 1989.
10. C. Liban, E. Vingilis, and H. Blefgen. The Canadian Drinking-Driving Countermeasure Experience. *Accident Analysis and Prevention*, Vol. 19, 1987, pp. 159–181.
11. R. Hingson, J. Howland, S. Morelock, and T. Heeren. Legal Interventions To Reduce Drunken Driving and Related Fatalities Among Youthful Drivers. *Alcohol, Drugs and Driving*, Vol. 4, 1988, pp. 87–98.
12. J. Jernigan. *Virginia's Program To Combat Drug-Related DUI: 1988–1989.* VTRC Report 92-R9. Virginia Transportation Research Council, Charlottesville, 1992.
13. E. Paltell and M. Booz. *Combating the Drug-Impaired Driver: A Prescription for Safer Highways.* VTRC Report 86-R20. Virginia Transportation Research Council, Charlottesville, 1985.

The opinions, findings, and conclusions expressed in this paper are those of the author and not necessarily those of the sponsoring agencies.

Publication of this paper sponsored by Committee on Alcohol, Other Drugs, and Transportation.