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AN EVALUATION OF THE EFFECTIVENESS OF THE INTERLOCK IN PREVENTING RECIDIVISM IN A POPULATION OF MULTIPLE DWI OFFENDERS

Final Report

for

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An Evaluation of the Effectiveness of the Interlock in Preventing Recidivism in a Population of Multiple DWI Offenders

Approximately 45,000 deaths and 5.5 million injuries each year are the result of motor vehicle crashes, making traffic crashes the leading cause of injury death in the United States (National Safety Council, 1991). The average age of victims is only 34. Crashes are the greatest single cause of death for every age group between five and 32 (National Safety Council, 1991). Because motor vehicle crash victims are disproportionately young, crash-related injuries are the third leading cause of lost years of life (National Safety Council, 1991).

Alcohol, a major contributing factor in motor vehicle crashes, is estimated to be involved in approximately 46 percent of all fatal traffic crashes and in 18 to 25 percent of all injury producing crashes (NHTSA, 1990). In 1990, more than 350,000 people were injured in alcohol-related (A/R) crashes, with more than 22,000 of those injuries being fatal (NCSA, 1991). Two of every five Americans can expect to be in an alcohol-related crash in their lifetime (National Safety Council, 1991). Economists estimate that the costs of such crashes to society exceed $21 billion, stemming from lost wages, reduced productivity, and medical and legal costs (NSA, 1990).

The staggering human and economic costs of alcohol-related motor vehicle crashes make alcohol-impaired driving a serious public health problem in North Carolina. In North Carolina in 1990, 91,404 DWI arrests were made statewide. That year, 13,263 alcohol-related crashes resulted in the deaths of 602 and injuries to 13,772 people.

Although the early part of the '80's witnessed a dramatic decrease in A/R driving behavior on our roadways, recent reports based on information from the Fatal Accident Reporting System (FARS) indicate that the proportion of drivers with BAC levels at or above .10 has remained at about 40 percent since 1987. Additional information from other states that regularly monitor DWI activity have indicated that an increasing proportion of those arrested for DWI and of those involved in A/R crashes are repeat DWI offenders (Simon, 1992; Fell, 1991). This is both good news and bad news. It is good because it means that many of our general deterrence programs have been effective

in preventing people from drinking and driving. It is bad because it means that in order to make further reductions in DWI-related activity more attention must be paid to preventing DWI recidivism.

In recognition of the great public health problem posed by drunken driving, North Carolina has made a great effort to address the problem. The Safe Roads Act of 1983 (SRA) was a comprehensive new law that focused on elimination of plea bargaining and of drinking/driving by young people. The SRA also sought to have a more equitable structure for the imposition of sanctions meted out in conjunction with a DWI. The reductions in alcohol-related and nighttime crashes indicate that North Carolina's Safe Roads Act of 1983 has had a general deterrent effect on DWI activity. However, the specific deterrent effect of the law has not been achieved, in that a significant proportion of those who actually are tried, found guilty and penalized are committing the offense again. Of the 65,714 people adjudicated for DWI in 1988, 32 percent (21,085) had one or more previous DWI convictions on their driving records and 31 percent of these (6,687) had two or more previous DWI convictions (Popkin and Martell, 1990).

The objective of this project was to evaluate the interlock in preventing subsequent DWI recidivism in a population of second time DWI offenders.

Background

The 1983 Safe Roads Act made sweeping changes in the handling of Driving While Impaired (DWI) cases in North Carolina. However, while the 1980's witnessed a general reduction in alcohol-related and nighttime crashes in North Carolina, a significant proportion of those convicted of DWI continue to be repeat offenders. Of the 65,714 people adjudicated for DWI in 1988, 32 percent had one or more previous DWI's on their driving records; and 31 percent of these had two or more previous DWI convictions (Popkin and Martell, 1990).

In an effort to reduce this high recidivism rate, the North Carolina Division of Motor Vehicles (DMV) has instituted several programs that target those drivers who have been convicted of more than one DWI. A driver convicted of a second DWI offense loses his/her driving privilege for a period of four years if the offenses occurred within a three year period. Those who have had more than two convictions receive a permanent revocation after committing two offenses within a five year period and a third within ten years.

For purposes of this report a second time offender is one who had another DWI offense within three years of his first offense. Second-time offenders who have had their licenses suspended for a four-year period may appeal for a conditional driver's license at the end of two years of a hard license revocation. The appeal process is complicated and involves the offender's providing documentation that he/she is no longer having a drinking problem. Upon successful completion of the application process, the offender must appear before a hearing officer with at least three character witnesses who will testify as to his/her reform. These witnesses must not have a current DMV revocation for any alcohol-related offense. The second-time offender makes his/her appeal before a single hearing officer.

Offenders with permanent revocations present the greatest driving risk. After three years of a hard license suspension, these offenders may petition for a conditional restoration. At this hearing, the applicant must make his/her petition before a panel of three hearing officers who question the individual and witnesses and then vote

independent of one another regarding the suitability of the petitioner to be granted a conditional license. Majority vote rules. He must also provide a recent substance abuse evaluation.

In January of 1990, the North Carolina DMV provided the option to participate in a pilot ignition interlock program to a select group of second-time DWI offenders who were petitioning for a conditional license restoration.

A Description of the Interlock

A recent advancement in the field of drunken driving countermeasures is the use of the ignition interlock, a device that prevents a car from starting if the driver is intoxicated. Unique among countermeasures, ignition interlocks target the agent in the public health framework -- the car -- as the point of intervention.

The notion of a "car that drunks can't drive" has been under consideration by the federal government since the late '60s. In 1970, Robert Voas wrote: "A car that could sense the capability of its driver and refuse to operate if the driver was not capable of safe performance, provides the most parsimonious approach to the problem of the impaired operator." Since then, two primary methods to identify a drinking driver have been considered -- performance tests and chemical tests. The former requires the driver to pass some type of dexterity test in order to start the car, and the latter requires the driver to pass an alcohol breath test to start the car. Difficulties with the development of dependable tests have delayed the use of both methods. However, recent improvements in the technology of electronic breath test devices have led to the development of breath test ignition interlock systems (Compton, 1988).

The popular device in current use is a breath test device attached to a car ignition system. Before starting the car, the driver is required to blow into a hand-held alcohol sensing device that determines the blood alcohol content (BAC) of a driver's deep-lung air sample and compares the driver's results with a pre-set limit. A BAC lower than the limit allows the driver to start the vehicle. If the driver tests above the allowable limit, the devices will 'lock out' the ignition system and the driver will be unable to start the car (Compton, 1988).

Potential Benefits of the Interlock

Developing a car which "drunks can't drive" has intuitive appeal, given the difficulties with educating or coercing drinking drivers to change their behavior or changing our social or physical environment. As the countermeasure targets the car, the interlock is attractive for a variety of reasons. It bypasses any decision-making requirement on the part of the driver; the driver is prevented from driving regardless of any personality or situational factors that might influence that decision. The ability of the interlock to bypass the individual's decision-making ability may be especially relevant for the population of repeat offenders. While estimates vary on the extent of alcohol problems among offenders, most studies show that the majority of those convicted have driving problems (Fell, 1990; Arstein-Kerslake & Peck, 1985). Drivers who are alcohol-dependent may be unable to control their drinking and consequently, may have great difficulty controlling their drinking and driving.

Ignition interlocks give immediate feedback on a driver's intoxication level and provide a driver with a reminder not to drink and drive each time he/she enters the car. Some evidence suggests that people are not accurate judges of their own levels of intoxication (Russ & Geller, 1985) and consequently may drive under the mistaken assumption that they are not intoxicated. By providing immediate feedback when a driver attempts to start the car, interlock may help a person more accurately judge his/her intoxication level. Over time, interlock may serve to teach drivers to separate their drinking and driving. In one study, 90 percent of interlock users self-reported that interlock has been successful in helping them learn to separate their drinking and driving (Morse & Elliott, 1991).

Interlock specifically prohibits driving while impaired. As described earlier, other interventions attempt to address the drunk driving problem by targeting either drinking behavior or driving behavior. Studies have failed to show that alcohol treatment or educational programs alone, which target drinking behavior, have much effect on highway safety (NHTSA, 1988; Fell, 1990). While researchers have found license sanctions, which target driving behavior, to be an effective measure in reducing recidivism rates, more recent studies have found that the combination of license sanctions

and rehabilitation is more effective than either alone (Fell, 1990). Although interlock is neither a license sanction nor a treatment program, it addresses drinking and driving as one behavior rather than targeting either drinking behavior or driving behavior exclusively.

In addition, the interlock provides a mechanism to keep a driver under the surveillance of the licensing system and at the same time, ensures that the driver is not driving while impaired while using the vehicle with an interlock. While license sanctions are effective in reducing recidivism, and are easily imposed, they are often difficult to enforce. Various studies report that 75 percent to 90 percent of those with suspended or revoked license continue to drive (Fell, 1990). An interlock allows a driver to operate a vehicle legally while ensuring he/she cannot drive drunk while in the vehicle with an interlock.

Limitations of Interlocks

In the public health framework, interlock directly targets the car, bypassing to some extent host and environmental factors which influence the practice of drunk driving. The device is, however, by no means foolproof in the real world. In laboratory testing of the devices available in 1988, NHTSA found a motivated individual could tamper with the system and bypass the device (NHTSA, 1988). Additional problems associated with the use of the device include: the risk that a person other than the designated interlock user will start the car; the possibility that the offender will use another car; and the danger that a person will drink after having started the car.

Devices currently available require a driver to provide a breath code to activate the device in order to make it more difficult for people other than the targeted offender, to start the car (Compton, 1988). In addition, many states have per se laws, making it illegal for another person to start a car for an interlock user or for an interlock user to solicit aid. To ensure that once the driver has started the car, he/she continues to drive sober, devices can be set to require retesting after a certain period of time (after 45 minutes in North Carolina).

Prior Evaluations of the Interlock

The development of reliable interlocks is relatively new. Hence, research to determine their effectiveness is sparse. Furthermore, two methodological limitations of existing studies raise questions concerning the reliability and validity of their findings. The primary objective of interlock programs is to reduce recidivism rates. However, the only measure of recidivism available to researchers is a repeat DWI offense in DMV driver files or involvement in an A/R crash. Given the low detection rates for drunk driving and estimates that the average amount of time between offenses ranges from one to two years (Fell, 1990), studies must either follow large numbers of people or cover long periods of time. Secondly, researchers have had to study interlock programs as implemented by agencies in the field. The studies, to date, all lack random assignment; and consequently, it is difficult to isolate the effects of interlock from other intervening influences.

Two studies have provided preliminary results regarding the effectiveness of the interlock as a countermeasure, using repeat DWI offenses as their primary outcome measure. Both have been underway for a few years, and consequently their conclusions are limited by the relatively short period of follow-up. A study conducted in Ohio (Morse and Elliot, 1990) matched convicted DWI drivers assigned to interlock with a license suspension group. Assignment to interlock was non-random with participation dependent on both judicial and self selection. However, the researchers noted the bias to be in the direction of higher risk for the interlock group. After 30 months, the recidivism rate for the interlock group was 3.4 percent as compared to 9.8 percent for the control license suspension group, a 65 percent reduction in rates.

In a California study (EMT, 1990), offenders assigned to interlock were matched with offenders from other counties where interlock was not available. After 30 months, 9.2 percent of the interlock participants were reconvicted for DWI as compared to 12 percent for the controls. Unfortunately, problems with the study implementation made it difficult to interpret this difference. The probationers were under little supervision and violations were numerous; many assigned to interlock did not have the device installed or failed to report for monitoring.

Both studies are ongoing and will provide further information regarding the effectiveness of interlock over time. Additional studies have been initiated or planned in Oregon, Maryland and Minnesota (Linnell and Mook, 1991).

Current findings do not enable us to identify the types of convicted drunk drivers for whom interlock would be most effective. With time, it may be possible to pool the results of programs targeting different groups of offenders in order to determine if there are particular types of offenders for whom interlocks are most effective. To date, the Ohio interlock program targets offenders with one of the following characteristics: a blood alcohol content (BAC) of greater than or equal to 0.20; a prior DWI conviction within the past 10 years; or those who refused the BAC test (Morris & Elliott, 1990). In California, although a diverse group of offenders was eligible for an interlock, reductions in recidivism rates were greatest among offenders with one or more prior convictions for DWI. In a Maryland study (1988), Baker concluded that multiple offenders may be the best target group based on the results of self-assessments of the usefulness of the interlock device by both first-time and multiple offenders. She found, compared to multiple offenders, first-time offenders were more hostile toward the device and their assessment of the device's usefulness was lower. Somewhat contradictory results were reported by a program implemented in Pennsylvania which targets first-time offenders. That program reported very low rates of recidivism among the first-time offenders on interlock (Linnel & Mook, 1991).

In summary, based on the studies conducted to date, interlock appears to be a potentially useful countermeasure to address the problem of drunk driving. In a recent "Report to Congress", Compton (1988) concluded that because "there was not enough evidence that the devices are effective, it is not appropriate for the devices to be used in lieu of other sanctions that have evidence of beneficial effects (e.g., suspension); however, use of this technology as an additional condition of probation or for reinstatement of a restricted driving privilege does appear appropriate." The report advocates additional research to determine the effectiveness of the devices.

North Carolina's Interlock Program

The North Carolina Interlock Pilot Program began in North Carolina in January 1990. Its primary goals are to:

1. Provide a more verifiable restoration program;
2. Reduce DWI recidivism;
3. Reduce DWLR offenses;
4. Introduce an additional tool of deterrence by separating the intoxicated driver from his or her vehicle;
5. Introduce a known behavioral modification tool in changing the driving habits of the DWI offender;
6. Introduce an additional punitive element as part of the highway safety "sanctioning package": and
7. Provide a deterrent action for the entire driving population through their desire to avoid forced interlock use.

The interlock program in North Carolina is administratively managed by the Division of Motor Vehicles under the statutory authority of DMV's commissioner. The DMV contracts with a private company, Monitech, to install its Guardian interlock devices and monitor the program. Consequently, the DMV is responsible for assigning offenders to the program, and Monitech has the responsibility of monitoring the offenders once offenders enter the program.

Sanctioning Process. In North Carolina, the DMV suspends the license of all persons convicted of a second DWI offense for a period of four years. After serving two years, all second time offenders are eligible to petition for a conditional license valid for the remainder of their suspension period. Conditional licenses granted to DWI offenders generally restrict the driver to daylight-only driving and prohibit the consumption of any alcohol while driving. If the driver violates any terms of the conditional license, the conditional license is revoked for the balance of the four year revocation; and the four years of his/her license suspension period begins again. Approximately one half of the offenders eligible to petition actually begin the application process.

Conditional License Application Procedure. The conditional license application process is lengthy, taking an average of three to five months. The procedure requires the petitioner to submit documentation that he/she has incurred no additional criminal or vehicular records and is not currently abusing alcohol or drugs. Once this documentation is submitted to the DMV, the file is turned over to one of 20 DMV hearing officers responsible for making decisions on license restoration. On the basis of this documentation, the hearing officer either makes a determination that there is a disqualifying conviction and disqualifies the petitioner or grants the petitioner a hearing.

Hearings. At the hearing, the petitioner is required to testify regarding his/her alcohol use. Three witnesses, who know the petitioner well enough to attest to his/her character, are asked to confirm whether the petitioner is or is not currently drinking. Three outcomes of the hearing are possible. The hearing officer can: (1) deny the petitioner's application; (2) grant the petitioner a conditional license and require participation in the Interlock program or; (3) grant the petitioner a conditional license.

Criteria for Issuance of a Conditional License. Assignment of petitioners to the Interlock program is not random, but rather is made upon the completion of the petition and the decision of the hearing officer. Each officer is required during the hearing to complete a form indicating that the offender has been assigned to interlock, given a conditional license without interlock, or denied a license.

No set policy guides the hearing officers' decisions during a hearing. However, preliminary discussions with several hearing officers suggest that the officers use the interlock as an extra control measure if they are reasonably certain the person is not drinking, but believe the person needs some additional support and that highway safety needs some additional assurance. Thus, it can be hypothesized that the interlock group is more at risk for a repeat DWI than the conditional license group, but less at risk than the group denied a conditional license.

Self Selection. Once a hearing officer offers either a conditional license with or without interlock to a petitioner, the petitioner may choose to accept or reject the offer. This decision may be affected by several factors: the high cost of insurance for DWI offenders; the cost of interlock itself; objections of other family members; and the

ownership of a car. Offenders who reject the offer of interlock are consequently unlicensed for the remainder of their four-year suspension period, but may reapply for another hearing after one year.

Implementation by Monitech: the Interlock Service Company. The DMV contracted with a private company, Monitech, to supply, install, and monitor the Interlock devices and their use. Currently, Monitech has one installation center located in the middle of the state and two additional service centers regionally located in the eastern and western parts of the state. The company is required by the state to provide service to interlock users throughout the state within 24 hours.

Program Monitoring. Petitioners who agree to participate in the Interlock program do not receive their conditional license until they provide the DMV with installation papers from Monitech. This assures the DMV that a petitioner has, in fact, had an interlock installed. Once the device is installed, the participant must return to the service center every 60 days for a monitoring check. The device itself will warn the user that a check is needed by emitting regular beeping noises. If the user misses a monitor check, the device will lock-out the ignition system, and the user will be unable to start the car. Interlock users are in close contact with Monitech personnel, returning to the service center every 60 days and calling if they have problems with their device. The company must submit compliance reports to the DMV for all installations, monitoring checks and device removals.

Program Costs. All program costs are the responsibility of the offender. Costs include an installation fee of $70 and a fee charged at each monitoring check. Monitech is required by the DMV to provide assistance to offenders who qualify for food stamps. Thus, the program costs are born by the individual offenders and Monitech rather than the State.

Methods

An ideal experimental design for the evaluation of the program would call for persons convicted of a second DWI offense to be randomly assigned to (1) receive a license without interlock, (2) receive a license with interlock, or (3) not receive a license; and then monitor and compare the recidivism rates of these groups over time. However,

random assignment is not possible in North Carolina as licensing decisions are made at the discretion of DMV hearing officers and in some instances, by judicial discretion. Thus, it is likely that differences existed among the second-time offender groups at the onset of the study period; and consequently, it is likely that group recidivism rates reflect, in addition to treatment effects, driver characteristics prior to assignment. For this reason, the present study describes how these groups differed at the time of arrest for second time DWI and then compares their recidivism rates.

This study examines North Carolina DMV's current programs for handling second-time DWI offenders.

Study Population and Group Assignment: All DWI offenders convicted of their second offense between January 1, 1986, and November 3, 1989, were identified using the Division of Motor Vehicle's driver history files. The offenders were categorized by group using information from the driver history files and a list of interlock participants provided by the DMV. The four groups were defined as follows:

1. Non-Applier Group (Non-Appl.) consists of those who never applied or who began the application process but did not complete the documents necessary to be considered for a hearing and consequently have no license.

2. Denied License Group (Denied) are those who completed their application documents, but were denied a conditional license by the hearing officer. The hearing officer may have rejected their request based solely on a review of their documents or on the basis of further information obtained during a hearing. Also included in this group are those who were offered a conditional license with mandatory participation in the interlock program but declined.

3. Interlock Group (Interlock) includes those who obtained a conditional license and had an interlock installed on their vehicles; and

4. Conditional License Group (Cond. Lic.) are those who obtained a conditional license and were not required to participate in the interlock program. This group was believed by the hearing officers to present the lowest highway safety risk.

The survival of each of these groups of drivers was followed during the four-year period of suspension and for the period of time after which they had gained full licensure (and had the interlock removed).

Measure of Recidivism. Because of the short length of follow-up, DWI recidivism was measured by a subsequent arrest or reconviction for DWI recorded in the DMV files.

Time at Risk. Recidivism was examined retrospectively for three time periods:

TIME 1: To examine how the four groups differed before becoming eligible for a hearing, recidivism data were collected during the pre-hearing time period for each of the four groups. The number of DWI events was determined for Non-Appl. and Denied Groups for the first 730 days of their license suspension period. The number of DWI events was determined for the Interlock and Cond. Lic. Groups for the period of time before they received their conditional license.

TIME 2: Data for Time 2 were collected for the second period of the four-year suspension . For offenders in the Interlock and Cond. Lic. Groups, this time period began when they received their conditional license. For offenders in the Non-Appl. and Denied Groups, this time period began on day 731 of their license suspension. Each offender was followed until either he/she received a full license at the end of his/her suspension period or March 1992.

TIME 3: A final examination was made of recidivism rates of those second-time offenders in each group who completed their four-year suspension period and received a full license. (Because the pilot Interlock program only began in January 1990, the post-licensing interlock group is relatively small.)

Analysis. The percentage of offenders in each group arrested and/or reconvicted for DWI was calculated for the three time periods. Additionally, failure rates per 100,000 exposure days were calculated for the four groups during the three separate time periods by dividing the total number of arrests and/or convictions for each group by the total days of exposure for each group. The failure rates for the Cond. Lic. and the Interlock groups during their conditional license period (TIME 2) were compared and the significance of the difference calculated.

Limitations of the study. The study design was quasi-experimental, which affected the assignment of individuals into groups. Thus, it is likely that differences existed among the second-time offender groups at the onset of the study period, and consequently likely that group recidivism rates reflect, in addition to treatment effects, driver characteristics prior to assignment.

The study findings should be interpreted with caution. The following research limitations should be considered when interpreting the results: 1) Lack of random assignment: 2) Small numbers of Interlock participants; and 3) Short time at risk.

FINDINGS

A total of 22,418 offenders convicted of a second-time DWI offense between January 1, 1986, and November 3, 1989, were identified: 19,206 Non-Appliers (Non-Appl.); 1,889 in Denied Conditional License Group (Denied); 407 in the Interlock Group (Interlock); and 916 in the Conditional License Group (Cond. Lic.). Table 1 presents the average age, race, and sex and BAC level at the time of arrest for each group. The majority of the second-time DWI offenders were white males with an average age of 31.5

TABLE 1

Characteristics of second-time offenders by group.

	Non-Appl N=19,206	Denied N=1,889	Interlock N=407	Cond.Lic. N=916	Total N=22,418
Age	31.4	31.3	31.5	33.0	31.5
% White	66.4	76.1	83.0	84.0	68.0
% Male	90.9	88.5	84.8	82.9	90.0
Average BAC	16.5	16.1	16.7	16.3	16.5

and an average BAC at arrest of 16.5. Non-Appliers were more likely to be male and non-white than the three groups whose members completed the license application process. There are few differences among the three groups that applied for a conditional license, although the Denied Group's members were slightly more likely to be non-white

males, and the Cond. Lic. Group was more likely to be female. It is interesting to note that the Interlock group had the highest mean BAC level at the time of arrest.

Table 2 presents the failure rates during TIME 1. A substantial difference exists between Non-Appl. Group and the groups who applied for conditional licenses. Eighteen percent of the Non-Appl. Group were rearrested or reconvicted during TIME 1 as compared to only one percent of the other groups. Their failure rate was 24.4, compared with failure rates ranging between 1 and 1.7 for the other groups applying for a conditional license.

TABLE 2

Recidivism rates of second-time offenders by group during TIME 1				
	Non-Appl	Denied	Interlock	Cond. Lic.
# Rearrested	34.0	23.0	5.0	9.0
% Rearrested	18.0	1.2	1.0	1.0
Failure Rate Per 10^5 Exposure Days	24.4	1.7	1.2	1.0

TIME 2. Table 3 presents the failure rates for offenders during TIME 2 (the second half of the license suspension period). The Non-Appl. and Denied Groups have no license, while the Interlock and Cond. Lic. Groups both possess conditional licenses. For the Non-Appl. Group, the percentage of offenders who recidivate, was considerably lower during TIME 2 as compared to TIME 1. The Non-Appl. Group failure rate per 10^5 for this period was 12.4.

The groups that applied for conditional licenses experienced increases in their failure rates between TIME 1 and TIME 2. The Denied Group's failure rate increased from 1.7 The Interlock Group shows a similar increase from 1.2 to 7.8. The Cond. Lic. Group increased from 1.0 to 13.5. Of special interest to the study is the difference in the failure rates of the three groups applying for a conditional license. The failure rates of in the first two years of its license suspension period to 7.7 during the second two years.

TABLE 3

Recidivism rates by group during				
	Non-Appl	Denied	Interlock	Cond. Lic.
# Rearrested	1,891	106	11	65
% Rearrested	9.8	5.6	2.7	7.1
Failure Rate Per 10^5 Exposure Days	12.4	7.7	7.8	13.5

the Denied Group and the Interlock Group are the same even though the Denied Group is unlicensed and should have no driving exposure. For those licensed groups, Interlock and Cond. Lic, the difference in failure rates is statistically significant ($p < .05$).

Table 4 presents data on the failure rates for the four groups during the entire four-year license-suspension period. During this time, the Non-Appl. Group experienced a failure rate of 18.2. Among the groups that apply for a conditional license, the Interlock Group had the lowest failure rate (2.9), followed by the Denied Group (4.7) and the Cond. Lic. Group (5.2).

A considerable difference in the exposure times between groups was found. The average exposure days per offender in each group are: 793.4 days for Group 1; 726.4 for Group 2; 346.2 for Group 3; and 527.3 for Group 4.

TIME 3. The failure rates of those study participants completing their license suspension period and receiving a full license are presented in Table 5. During the study period, 2,621 members of the Non-Appl. Group completed their four-year license suspension period and received their full license, whereas 1,048 members of the Denied Group, 160 members of the Interlock Group, and 428 members of the Cond. Lic. Group received a full license. The percentage of those offenders arrested or reconvicted after receiving their full license is similar for the Non. Appl. and Denied Groups -- 13 percent and 14 percent respectively -- and the Interlock and Cond. Lic. Groups at 6.3 percent

TABLE 4

Recidivism rates by group during license suspension period				
	Non-Appl N=19,206	Denied N=1,889	Interlock N=407	Cond. Lic. N-916
# Rearrested	5,311	129	16	74
% Rearrested	27.7	6.8	3.9	8.1
Failure Rate Per 10^5 Exposure Day	18.2	4.7	2.9	5.2

and 5.8 percent. However, when the failure rate for the four groups is determined, the Interlock Group had a rate (35.7) comparable to the Non-Appl. (37.4) and Denied (33.0) Groups, while the Cond. Lic. Group maintained a much lower rate, 14.4.

TABLE 5

Recidivism rates by group after full-license restoration				
	Non-Appl N=2,621	Denied N=1,048	Interlock N=160	Cond. Lic. N=428
# Rearrested	341	147	10	25
% Rearrested	13.0	14.0	6.3	5.8
Failure Rate Per 10^5 Exposure Days	37.4	33.0	35.7	14.4

Discussion

The primary purpose of this study is to determine the effectiveness of the Interlock program, as implemented in North Carolina, in reducing recidivism among second-time DWI offenders. Because the results of this study are preliminary, conclusions must be interpreted with caution given the research limitations mentioned earlier.

North Carolina's DMV is trying innovative approaches to deal with its large number of DWI recidivists. The licensing sanctions are quite stringent for recidivists. DMV has implemented a rigorous application process for any offenders seeking a conditional license. The number of forms and extent of information the applicant must complete undoubtedly discourages the less determined from applying. Many others disqualify themselves from eligibility by committing the offense again before they are eligible to apply for a hearing. Those second time DWI offenders who completed the application process for a conditional driver's license were less likely to have been arrested for another DWI during the two-year hard license revocation period and maintained a lower failure rate for DWI during the entire revocation period.

The study results can be generalized only to a relatively small low-risk group of second-time DWI offenders, given that the majority of offenders, by not completing the application process for a conditional license, select out of the Interlock program. These offenders appear to be a higher-risk group than those who apply. Additionally, the fact that only a small percentage of offenders complete the application process may indicate that these offenders are different in some way than those who did not complete the application, perhaps more motivated to drive or more capable of safe driving.

The primary comparison groups examined to test the effectiveness of Interlock consisted of those offenders who applied for a conditional license. Hearing officers determine the composition of the three primary groups under study. While the study included no mechanism to assess risk among the offenders assigned to the three study groups, as previously described, informal interviews with several hearing officers suggest that officers consider interlock participants to rank between the denied group and the conditional license group in risk. If this assignment process is followed, the study provides a conservative estimate of the effects of interlock as compared to either license denial or the conditional license.

The failure rates found after offenders received their full licenses indicate that while the Interlock program reduces recidivism during the period of program participation, the suppression effect may not continue once the devices are removed and participants leave the program. Through interviews and questionnaires, Interlock users in several studies

have stated that Interlock has served to reduce their drinking or helped them drink more responsibly (Linnell & Mook, 1991) suggesting that interlock may function to change drinking/ driving behavior. The findings in this study suggest that any behavior change effects of interlock are dependent on participation in the program and may not continue after the device is removed. The findings suggest that Interlock programs may control a driver's behavior while under the program auspices but may not serve to change drinking/driving behavior over time.

In summary, those second-time DWI offenders in North Carolina receiving the interlock at the end of two years of a hard license revocation fared better during the final two years than those who had a four-year hard license revocation. In addition, the interlock group's recidivism rate was significantly better than that of the conditional licensees during the period of time that the interlock was installed on the car. Unfortunately, recidivism levels for the Interlock group returned to higher levels after full licensing privileges were returned, and interlocks were removed. The low failure rate at full licensure of the Cond. Lic. Group supports the hypothesis that the hearing officers are successfully identifying the lowest risk group to receive a conditional license. Once all sanctions have been removed, this group performs the most successfully.

Several areas for research are suggested by the study findings:

1. The North Carolina study should be continued for an additional period of follow-up after the Interlock device is removed in order to provide stronger evidence on the long-term effectiveness of the Interlock.

2. The data available should be analyzed to determine the amount of time Interlock was installed. A comparison of installation time between those who failed after the device was removed and those who did not would permit exploration of the possibility that the long-term effects of Interlock are time-dependent. Future studies should examine the effects of variable installation time on both the short (during program participation) and long-term (after removal) effects of Interlock installations.

3. To understand the dynamics of program effectiveness, information should be collected from Interlock participants about their attitudes, opinions and feelings regarding the Interlock program. Of particular interest are their perceptions of the effects of interlock installations, both short and long term, on drinking/ driving behavior and their perception of the role of the

service provider in assisting an offender to change his/her drinking driving behavior.

4. The large number of offenders who do not complete the application process and their high rate of recidivism during the four-year license suspension period indicates a need to examine more closely who does and who does not apply for a conditional license and how these differences may affect the effectiveness of Interlock.

Recommendations

It was difficult to estimate any long term behavior benefits of the Interlock program because the study was limited by the both the number of cases and amount of follow-up time at full-licensure. From research conducted to date, it is not known how Interlock might function to break the drinking/driving cycle. If Interlock operates primarily as a control mechanism and produces no change in long-term drinking/driving behavior, as the preliminary results of this study suggest, the devices may need to be installed on offenders' cars either permanently or for a longer period of time. If long-term behavior change is desired, the Interlock program may need to be coupled with remediation or other supervisory programs targeting drinking behavior. The results of this study are preliminary and do not provide conclusive evidence to support either direction at this time.

Although random assignment may not be possible within the North Carolina sanctioning system for second-time offenders, consistent data collection on offender characteristics ultimately would provide more information on the type of offender who would benefit most from the use of Interlock. The information would allow the DMV to further develop sanctioning of drunk driving and to use the Interlock program for offenders most likely to benefit.

The North Carolina program is still relatively small, serving approximately 700 second and third-time offenders. Until now, the program owner and staff have kept in close contact with program participants. It is possible that the effects of the Interlock program found in this study reflect some aspect of the close contact with the service personnel rather than an effect of the Interlock device itself. As the program grows, it

will be essential to monitor the failure rate of Interlock participants in order to determine the maximum number of participants the program can serve effectively.

Monitech, the North Carolina Interlock service provider, is currently computerizing its system to monitor program participants. Several states are in the process of developing Interlock programs. The information that Monitech has the potential to provide regarding both the service time spent monitoring the program (i.e., responding to service problems, scheduled monitoring checks, etc.) and the types of service problems experienced will be invaluable in the development of model programs.

The finding that a majority of offenders do not complete the application process for a conditional license and that these offenders experience a high failure rate throughout the four-year license suspension period indicates an area of concern for the North Carolina sanctioning program for second-time offenders.

CONCLUSIONS

Numerous evaluations have been made of the impact of various sanctions (Voas 1986; Nichols and Ross 1989) on general DWI deterrence as measured by A/R crashes, single vehicle nighttime crashes and DWI arrests. However, it has been challenging to determine the deterrent value of individual sanctions because they are frequently implemented as part of a comprehensive set of countermeasures so that their individual contribution is difficult, if not impossible, to assess. Moreover, many evaluations have been handicapped by a lack of agreement on appropriate criteria for measuring effectiveness.

Evaluation of sanctions has further been complicated by the uniqueness of the settings in which they have been employed. The philosophy of the citizens of a state or jurisdiction shapes its public policy/law making. This means that the entire milieu in which sanctions and countermeasures are evaluated may differ from state to state. The variations are numerous, and interpretations of the successfulness of a particular program as well as its transferability to other jurisdictions must be carefully considered. Thus,

sanctions found effective in one area of the country may have limited effectiveness in North Carolina.

As elsewhere, North Carolina has a set of problem drinkers who drive while impaired. This evaluation sought to examine a specific program designed to restrict those convicted of DWI so that they might be less likely to have a subsequent DWI arrest or A/R crash. It did not focus on the general deterrence effectiveness of this sanction in terms of its impact on the general driving population. DWI arrests were used as the outcome measure because several of the programs studied have small numbers and crashes are infrequent events even among this population of high risk drivers.

Determining the specific deterrent effectiveness of the variety of sanctions applied to DWI offenders is an arduous task because little information is available to enable one to differentiate the characteristics of the offender and his drinking and drinking driving history which might enable us to identify a group of high risk drivers who should never be relicensed or a group who present no risk to the general driving public or themselves.

Our evaluation of the screening process employed by the Division of Motor Vehicle for relicensing second time DWI offenders indicates that North Carolina has a very stringent program for relicensing this problem group of drivers. All DMV programs are designed to prevent A/R crashes by restricting the exposure of high risk drivers. Clearly, the North Carolina Division of Motor Vehicles has done a good job in identifying the lowest risk group of second time DWI offenders from whom a condition license restoration is appropriate. It has gone one step further, in terms of trying provide the most mobility to this high risk group by imposing the requisite licensing sanctions and then providing the individual applying for a conditional license with an opportunity to drive if they participate in the interlock program. While not without problems, this appears to be a useful tool for restricting the driving of high risk drivers in that it targets their vehicle as the point of intervention. It permits these offenders to drive, something vital to everyday existence in North Carolina, while at the same time, protecting the public.

This study supports the conclusion that the North Carolina Interlock program serves to reduce recidivism while the device is installed on the car. It suggests, however that

Interlock does not serve to change the long- term behavior patterns of drinking drivers which reemerge once participants have left the program. The study conclusions must be interpreted with caution given the research limitations described earlier.

The positive results of the study are sufficient to recommend the continued experimental use of ignition interlocks as a sanction for second- time offenders in North Carolina. The limitations in the study design and expected future growth in the Interlock program in North Carolina indicate the need to continue to measure the effects of the program over time.

In May of 1992 the pilot interlock program was made available to those offenders with a permanent revocation. This is a group of drivers that is more overtly unwilling or unable to control their drinking. These drivers often are adept at circumventing the system, for example, several drivers with permanent revocations have three or more licenses - all of which have permanent revocations. It is extremely important that a sound policy be implemented for monitoring these drivers.

Finally, of gravest concern to highway safety in North Carolina are the large numbers of drinking drivers who leave the licensing system completely and continue to drive often drunk. The development of countermeasures to separate these people from their vehicles is desperately needed.

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