Approved Feb 16, 2000
Date

MINUTES OF THE SENATE JUDICIARY COMMITTEE.

The meeting was called to order by Chairperson Emert at 10:14 a.m. on February 15, 2000 in Room 123-S of the Capitol.

All members were present.

Committee staff present:
Gordon Self, Revisor
Mike Heim, Research
Jerry Donaldson, Research
Mary Blair, Secretary

Conferees appearing before the committee:
Rosalie Thornburgh, Kansas Department of Transportation (KDOT)
Sheila Walker, Revenue Department
Chris Noble, Kansas Coordinators of Alcohol Safety Action Projects (KCASAP)
Jerry Gentry, Kansas Ignition Interlock

Others attending: see attached list

The minutes of the February 11th meeting were approved on a motion by Senator Bond, seconded by Senator Petty. Carried.

SB 553–related to driving under the influence of alcohol or drugs; penalties

Conferee Thornburgh presented testimony on **SB 553** a bill which she stated would modify penalties for repeat "driving under the influence" (DUI) offenders and bring Kansas law into compliance with federal law to avoid penalty transfers of federal highway funds. (attachment 1) Lengthy discussion followed.

Conferee Walker testified as neutral on **SB 553** but expressed several concerns regarding the implementation of the modified penalties for repeat DUI offenders. She stated that of the three options, e.g., impoundment, immobilization or ignition interlock, the Division of Vehicles would choose ignition interlock as their restriction of choice and explained why. She also recommended deleting a confusing sentence in the bill on page 1, lines 37-38. (attachment 2)

Conferee Noble briefly testified in support of **SB 553** with the exception of the ignition interlock device as a restriction. He stated that his organization has testified in opposition to this device for "years." (attachment 3)

Conferee Gentry testified in support of **SB 553.** He described what the bill does and described how the ignition interlock device works and how it provides accountability concerning an offender's conduct during the period of installation. He cited studies which reveal it's effectiveness and impact on driver behavior. (attachment 4)

Written testimony supporting **SB 553** was submitted by Madd. (attachment 5)

The meeting adjourned at 10:58 a.m. The next scheduled meeting is February 16.

SENATE JUDICIARY COMMITTEE GUEST LIST

DATE: Feb 15, 2000

NAME	REPRESENTING
KEN McNEILL	ABATE OF KS INC.
Doriene Mann	ABATE of KS inc.
Chris Noble	KCASAP
Katrina Hull	University Daily Kansan
Stephanie Turner	
Jane Rohr	AG Office
Terry Gentry	Kansas Justice Institute / Lobbyist
STEVE KEARNEY	KSFFSAFER/INTERLOCK
Paul Davis	KS Bar Assn.
Jeff Bottenberg	KPOA / KSA
Diane Caldwell	KAASAP
Bill Henry	KS Gov. Consulting
Jessica Concoran	Sen Vratil
Chris Confer	Sen Emert
Harry Tiffany	KDOR
Sheila Walker	KDOR-DMV
Nancy Boaina	KDOT
Terry Humphrey	KTLA

STATE OF KANSAS

KANSAS DEPARTMENT OF TRANSPORTATION
OFFICE OF THE SECRETARY OF TRANSPORTATION
Docking State Office Building
915 SW Harrison Street, Rm.730
Topeka, Kansas 66612-1568
Ph. (785) 296-3461 FAX (785) 296-1095
TTY (785) 296-3585

E. Dean Carlson
Secretary of Transportation

Bill Graves
Governor

TESTIMONY BEFORE SENATE JUDICIARY COMMITTEE

REGARDING SENATE BILL 553 PENALTIES FOR DUI REPEAT OFFENDERS February 15, 2000

Mr. Chairman and Committee Members:

I am Rosalie Thornburgh, Bureau Chief of Traffic Safety. On behalf of the Department of Transportation, I am here today to testify on Senate Bill 553 regarding enhanced criminal sanctions for DUI offenders and the federal requirement to enact a "repeat offender" law.

The Transportation Equity Act for the 21st Century (TEA-21) authorized Section 164 which encourages States to enact and enforce a repeat intoxicated driver law that establishes at a minimum, certain specified penalties for second and subsequent convictions for driving under the influence. These penalties include: 1) a one-year driver's license suspension, 2) the impoundment or immobilization of, or the installation of an ignition interlock system, 3) assessment of the repeat intoxicated driver's degree of alcohol abuse, and treatment as appropriate, and 4) the sentencing of the repeat intoxicated driver to a minimum number of days of imprisonment or community service.

Currently, Kansas law complies with three of the four criteria, leaving us in noncompliance with Criterion 2. This legislative proposal contains the necessary legislation to 1) enhance the ignition interlock sanction by applying it to all repeat offenders, or 2) provide for motor vehicle impoundment, or 3) provide for motor vehicle immobilization. Only one of the three sanctions is required for compliance.

Any state that does not enact and enforce a conforming repeat intoxicated driver law will be subject to a transfer of funds. If Kansas does not meet the statutory requirements on October 1, 2000 (FFY 2001) or October 1, 2001 (FFY 2002); one and one-half (1½) percent of certain federal-aid highway construction funds will be transferred to the State's Section 402 highway safety program. If the State does not meet the statutory requirements on October 1, 2002 (FFY 2003), three (3) percent will be transferred. Three percent will continue to be transferred on October 1 of each subsequent federal fiscal year, if the State does not meet the requirements on those dates. The funds transferred must be used for alcohol-impaired driving countermeasures or activities under Section 152 Hazard Elimination Program.

Based upon current estimates, the penalty transfer amount for FFY 2001 would be $3.3 million. The penalty transfer in FFY2002 would be $3.4 million and beginning in FFY 2003 the penalty transfer amount would be $6.9 million per year.

In summary, passage of this legislation would bring Kansas into compliance with the federal requirements contained in Section 164. Compliance with Section 164 would prevent a penalty transfer from federal-aid highway funds on October 1, 2000, thus preserving the federal-aid highway construction dollars.

'E OF KANSAS
Bill Graves, Governor

DEPARTMENT OF REV[illegible]IE
Karla J. Pierce, [illegible]ry

Sheila J. Walker, Director
Division of Vehicles
915 SW Harrison St.
Topeka, KS 66626-0001

(785) 296-3601
FAX (785) 291-3755
Hearing Impaired TTY (785) 296-3909
Internet Address: www.ink.org/public/kdor

Division of Vehicles

TESTIMONY

TO: Chairman Tim Emert
Members of the Senate Judiciary Committee

FROM: Sheila J. Walker, Director of Vehicles Sheila J. Walker

DATE: February 15, 2000

SUBJECT: Senate Bill 553

Chairman Emert and members of the Senate Judiciary Committee, my name is Sheila Walker, and I serve as Director of the Kansas Division of Vehicles. Thank you for allowing me to provide testimony today regarding Senate Bill 553. The Division of Vehicles is neutral on this bill – we will implement impoundment, immobilization or ignition interlock if you and your colleagues decide that we should. As you make that decision, we would respectfully like to express a few of our concerns.

Effective administration of either impoundment or immobilization is virtually impossible. There is no common link between the Kansas Driver's License System (KDLS) and the Vehicle Information Processing System (VIPS). In other words, we have no effective way of matching drivers to their vehicles.

For example, of the 1.9 million licensed drivers in this state, there are at least 354 Kansans with some form of the name "John Smith" on their drivers' licenses. Meanwhile, 822 of the 2.6 million vehicles registered in this state are listed in some form of the name "John Smith." Matching the "John Smith" drivers to their vehicles would be problematic, likely resulting in errors and an increase in irate phone calls.

The Division of Vehicles could implement ignition interlock more effectively than impoundment or immobilization. In fact, ignition interlock is already an option for first-time DUI offenders. Under current law, the Driver Control Bureau administratively suspends the license of first-time DUI offenders for 30 days. The driver then has the option of being restricted for 330 more days (which means he can drive to and from work, to and from school, and to and from drug education programs) or he can choose to get an ignition interlock device installed in his vehicle and drive wherever he wants (as long as he continues to successfully pass the built-in breathalyzer test). Under this option, there are less than 100 drivers a year who are required to get an ignition interlock device installed in their vehicles.

Jud 2-15 att 2

If the ignition interlock portion of this bill passes, Kansas would go from requiring about 100 drivers a year to have ignition interlock devices installed in their vehicles to approximately 3,000 drivers a year. We anticipate that we would need an additional Office Assistant IV (at $28,472 a year) to manage the ongoing increase in operational workload.

In addition, we do not fully understand the reason for this sentence: "Any time period of ignition interlock restriction shall be credited to the one-year minimum reinstatement time period." (Page 1, lines 37-38) This sentence is confusing, and we recommend it be deleted.

In conclusion, given the three options before us – impoundment, immobilization or ignition interlock – ignition interlock is the Division of Vehicles' restriction of choice. Thank you for the opportunity to share our thoughts on this bill.

Senator Tim Emert, Chairman
Committee on Judiciary
Statehouse
Topeka, KS

February 15, 2000

Good Morning Chairman Emert, and Members of the Committee,

My name is Chris Noble and I am a member of the Kansas Coordinators of Alcohol Safety Action Projects (KCASAP). Our organization provides alcohol and drug evaluations and monitoring services for all thirty-one Judicial Districts in the State of Kansas for those persons who have been arrested for DUI and other alcohol/drug related offenses.

We have been aware of a long-standing problem concerning individuals who continue to operate a motor vehicle after having their driving privileges suspended or revoked for driving under the influence of alcohol or drugs. These repeat offenders appear to realize that the probability of getting caught driving in violation of that suspension is relatively low. These repeat offenders appear to know that if they don't call attention to their driving, the probability of being caught is almost non-existent. And if they are caught and prosecuted, the penalty on conviction is currently a Class A or B misdemeanor. Current law for conviction mandates a minimum $100 fine, possible jail time of at least 5 days, and further suspension of their driving privileges.
However, if we remove the vehicle of the repeat offender from operation by impoundment or immobilization, we make an immediate impact on the offender by making immediate access to their vehicle substantially impossible. By immobilizing the vehicle in the offender's driveway is an ever present reminder to that offender that his or her privileges are not available to them at the present time.

KCASAP comes here today not in opposition to SB 553. The organization is concerned with the inclusion of the ignition interlock device in section 2 (C) of SB 553. Ignition interlock has long haunted the halls and chambers of this building. The organization has previously provided testimony for years in opposition to this particular item.

We support SB 553, with the exception of ignition interlock, as a significant step towards addressing this growing problem, and would urge the members of this committee to give this bill consideration.

Thank you for giving me the opportunity to appear before this Committee today.

Respectfully,

C. Noble

Chris Noble
Kansas Coordinators of Alcohol Safety Action Projects

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Testimony of Jerry Gentry
Senate Judiciary Committee
February 15, 2000

Chairman Emert and members of the Senate Judiciary Committee:

I am Jerry Gentry with Kansas Ignition Interlock and I am here to offer my support to Senate Bill 553. Senate Bill 553 as proposed would offer the option of three alternatives as additional sanctions following the one year suspension of a person's driving privileges following the second offense. The alternative of impoundment, immobilization or the installation of a state approved interlock device for an additional year following the one year suspension will bring the State of Kansas into compliance with the federal law that encourages states to enact certain penalties for DUI repeat offenders.

The use of approved ignition interlock devices is the single alternative of the three proposed that will give the State of Kansas feedback on the drivers conduct and driving habits as it relates to continuing to attempt to operate their car with any concentration of alcohol in their system. Ignition interlock devices provide accountability concerning an offenders conduct during the period of installation. Studies show that interlock devices impact the drivers behavior and aid in keeping drivers that have been drinking from being able to start their vehicles and operate them endangering others.

I have attached a reprint of an article from Traffic Safety that further discusses the efficacy of ignition interlock.

Thank you for your time.

Sen Jud
2-15-00
att 4

Ignition Interlocks Deter Impaired Drivers

by Peter Haapaniemi

Campaigns against drinking and driving have hit home with many people, and the overall fatality rates for intoxicated drivers have declined. But alcohol is still a factor in about 41 percent of fatal crashes, according to the National Highway Traffic Safety Administration. In particular, there is growing concern over the number of people who have recurring problems with drinking and driving. Nationwide, "roughly a third" of those arrested for drunk driving are repeat offenders, says James F. Frank, highway safety specialist with NHTSA's impaired driving division.

For decades, officials have relied on three basic methods for dealing with repeat offenders: revoke their licenses, impound their cars, or put them in jail. In recent years another approach has been finding its way into state programs: the use of ignition-interlock systems. These devices are essentially Breathalyzers linked to a car's ignition system. The driver has to blow into it in order to start the car. If there is alcohol on his or her breath, the car won't start.

Ignition interlocks have been commercially available since the mid-1980s. Today there are an estimated 30,000 in use across the United States. To date, 35 states have passed legislation authorizing their use, but how they are used varies from state to state. In general, those states that have active programs use ignition interlocks to deal with multiple offenders who have had their licenses revoked, and make the use of the device for a certain period of time a condition for re-licensing.

Study shows they work

Despite this widespread use, however, it has been difficult for officials to say whether the devices actually curb drinking and driving – until last spring when the University of Maryland announced the results of its research into that state's ignition-interlock program. The study "indicated that being in an interlock program reduced the risk of an alcohol traffic violation within the first year by about 65 percent," says Kenneth Beck, professor of Health Education at the University of Maryland.

The study is significant because of the population it studied. For the most part, past research looked at people who volunteered to be in a program. Such a population would presumably be predisposed to using the device and changing their behavior. So the Maryland study examined a random sample that was more typical of the overall repeat-offender population. "We did this to test under real-world conditions, where not everyone is going to be a faithful, compliant, good citizen," says Beck.

A University of Maryland study indicated that being in an interlock program reduced the risk of an alcohol traffic violation within the first year by about 65 percent.

The study tracked 1,387 repeat offenders who had lost their licenses, gone through treatment, and been deemed ready for re-licensing on a restricted basis by a medical screening board. They were randomly assigned to either the ignition-interlock program or a control group. "We monitored the one-year traffic arrest rate, and we found that these interlock programs work significantly better than the traditional treatment program at reducing the violation rate for

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Photo courtesy of LifeSafer Interlock Inc.

alcohol traffic offenses during that year when the interlock restriction was in effect," says Beck. In the end, 2.4 percent of the drivers using the device were arrested for alcohol-related offenses, as opposed to 6.7 percent of the control group.

Success depends on many factors

In addition to straightforward deterrence, ignition-interlocks are effective because they target a specific aspect of the problem, says Beck. "Previous approaches to dealing with drinking and driving have tried to prevent the drinking. The interlock addresses the point at which a drinking person will try to start and drive a car." It is a deterrent that doesn't simply rely on self-control.

The effective use of interlocks depends on the administrative aspects of a program, as well as the technological strength of the device. Screening, for example, helps make sure that individuals are in a position to benefit from an interlock, and ongoing monitoring complements the devices in making sure that people don't violate the rules of the program. In Maryland, participants had to bring their cars in for inspection every 60 days, allowing technicians to check for tampering and read the device's computer to see how often the car was started, how often breath tests were failed, and so forth. When someone was found to have "cheated" on the program, their license was immediately revoked.

In addition, ignition-interlock programs are often not as expensive or painful as some traditional programs. "We know that vehicle impoundment, incarceration and even license-plate impoundment work. But they are costly, and they are not always applied, because of judicial prerogative," says Beck. Judges are sometimes reluctant to take away a convicted person's car because the person may need it in order to keep a job, or other people in the family may be relying on that driver or the car. An interlock program provides some middle ground where action is being taken to control drunk driving, but the individual and his or her family still have access to a car.

In terms of cost, the interlock devices are usually leased for about $2 a day, which is borne by the individual in the program, rather than the state. "Of course there are some costs associated with a program," says Frank. "But there may well be some savings that are much greater than costs, if you calculate out the reduction in the number of people who are drinking and driving."

Not a cure-all

Ignition-interlock programs are not a miracle cure, however. "It's important to stress that they are an important counter measure, but they are by no means a perfect way of preventing [drinking and driving]," says Beck. The devices can be circumvented, although technological improvements are making that increasingly difficult. Among those arrested in the Maryland study, many were simply driving borrowed cars with no interlocks on. In addition, follow-up research in Maryland suggests that the interlock's effect on behavior is not permanent, and that once the devices are removed, the rate of alcohol-related arrests begins to climb. Beck says such findings suggest that longer-term use of interlocks may be warranted.

Finally, some hard-core repeat offenders will always remain beyond the reach of interlocks, simply because they will continue to drive without a license.

Still, interlocks provide one more tool for getting intoxicated drivers off the road. "There is going to have to be additional fine tuning on how these things are best utilized, but I think the first generation of projects has suggested that they are doing the job of suppressing drinking and driving among people who have them on their vehicles," says Frank. Indeed, NHTSA has committed itself to further research on the subject. "I think the general feeling is that there is a need to pull out all stops on the war on impaired driving," Frank says. "This is one approach that we hope will have some impact. We have to keep chipping away at the problem."

New devices prevent circumventi

Like technology in general, ignition-interlock devices have grown more sophisticated over the years. Older models, for example, reportedly could give false positive readings for alcohol when drivers had only been smoking cigarettes. Newer models are alcohol-specific.

The biggest problem, however, has been human ingenuity. "People always challenge the device," says Richard Freund, president of Cincinnati-based LifeSafer Interlock. As a result, NHTSA guidelines call for anti-circumvention features that counter tactics such as:

False or Filtered Breath Freund says people will try to blow through charcoal, which absorbs alcohol; use balloons to push air through the device; or even breathe through a 2-liter plastic bottle with a hole cut in the bottom in order to force a clean sample into the machine.

To beat such tricks, Freund's company's device requires people to provide a hum tone during the test; other systems require a coded sequence of breathes that is hard to duplicate mechanically.

Fake Test This is essentially having another person, who is sober, take the test and start the car, and then let the intoxicated person drive away. To help prevent this, devices today use a "rolling re-test" that requires the driver to blow into the device at certain intervals while driving. If he or she fails the test, the car's lights begin flashing and the horn starts honking (rather than having the car stop dead in traffic). "It draws attention to the car, and makes it easier for a police officer to have probable cause to pull someone over," says the University of Maryland's Kenneth Beck. The rolling re-test also prevents drivers from going to a bar sober, and leaving their car idling while they go in and drink.

Mothers Against Drunk Driving

3601 SW 29th Street • Topeka, KS 66614 • (785) 271-7525 • Fax (785) 271-0797 • 1 (800) 228-6233
KANSAS STATE OFFICE

February 4, 2000

Senator Tim Emert, Chairman
Senate Judiciary Committee
State Capital Room 356 E
Topeka, Kansas 66612

Dear Senator Emert and Senate Judiciary Committee Members:

On January 31, 2000, Senate Bill 553 was introduced in the Senate Judiciary Committee regarding prescribed minimum penalties for DUI repeat offenders as set forth in Section 164 of Title 123 of the Transportation Equity Act (TEA-21). Included in Senate Bill 553 are three option of which any one option would qualify Kansas under Section 164. The three options are: Vehicle Impoundment, Vehicle Immobilization and Ignition Interlock.

During the last legislative session, Senate Bill 4 was amended in the House to include provisions for ignition interlock devices. This bill currently remains in conference committee.

On August 10, 1999, a special Interim Committee of the Senate and House Judiciary held a hearing on Senate Bill 4. Kansas MADD provided expense funds to bring Dr. Robert Voas, Senior Scientist, Pacific Institute for Research and Evaluation and a foremost authority in the field of the use of ignition interlock devices, to Kansas to testify before the committee. Dr. Voas' credentials also include studies regarding the use of vehicle impoundment and vehicle immobilization penalties.

Confiscation, impoundment or even immobolization of a vehicle makes it impossible for a repeat offender to reoffend, unless he or she does so in other vehicles. And license impoundment/forfeiture offers a means of making more visible the offenses of those who continue to drive after multiple DUIs and license suspension or revocation. Since it is illegal to drive without proper evidence or registration, confiscation of the license plate makes it an offense more likely to be noticed by police.

Kansas MADD would like to provide you with a copy of Dr. Voas' testimony regarding ignition interlock and studies he has participated in regarding vehicle impoundment and vehicle immobilization.

Sincerely,

Dee Meyer

Dee Meyer
State Chairperson
Kansas MADD

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Statement of Robert B. Voas to
the Special Committee on Judiciary of the Kansas Legislature
August 10, 1999

My name is Bob Voas. I am a senior scientist at the Pacific Institute for Research and Evaluation, a non-profit research firm with offices in several states across the country. I received a Ph. D. in experimental psychology from UCLA. I joined the newly founded Department of Transportation in 1968 with the assignment to study the problem of impaired driving. I wrote the first scientific paper on alcohol interlocks 30 years ago in 1969. In 1992, our research group produced for the National Highway Traffic Safety Administration a set of specifications for interlock devices, which they issued in the Federal Register as a model for states. I and my colleagues have published seven papers on interlocks over the last 5 years. In the interest of full disclosure, I should inform you that while I have no financial or other interest in any interlock manufacturer or service provider, I have been a scientific consultant to Mothers Against Drunk Driving and presently serve on the National Board of that organization. I am here to answer your questions about Alcohol Safety Interlocks and other sanctions for drunk driving offenders. Before I do let, me provide a brief description of what we have learned from our research.

Research indicates that suspending the licenses of drunk driving offenders decreases their recidivism and crash involvement by at least 50%. However, research also indicates that 75% of DUI offenders drive while suspended. How is it then that suspension reduces their recidivism and crash involvement? The available evidence suggests it is because they drive fewer miles and drive more carefully than if not suspended. Thus, suspending the license is a good thing, but it has its limitations: Many of these suspended offenders are uninsured. If they injure someone, there is no way for the victim to be compensated.

Because it is difficult for the police to enforce the requirement for a valid license since they can only check the license if they have probable cause to stop the vehicle, these illicit drivers are rarely caught. As a result, when they have served the required period of suspension, having had the experience that they can drive while suspended with impunity, they do not go to the trouble and expense of the required insurance coverage to reinstate their licenses. The latest report from California indicates that the reinstatement rate for DUIs in that state is only 16%!

Thirty years ago, drivers arrested for DUI rarely lost their licenses. But since the passage by 39 states of administrative license suspension laws, most drivers now lose their driving permits for at least a short time. This increased application of the suspension sanction together with the difficulty of enforcing the requirement for a valid license, has resulted over time in the states accumulating more and more suspended operators driving illegally on their highways. The current estimate for the state of California by their Department of Motor Vehicles is that there are between 800,000 and one million suspended drivers on California roads. States are responding to this problem by passing laws that provide for impounding the vehicles driven by suspended drivers. These laws have been found to be effective in further reducing the recidivism rates of suspended operators.

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The interlock would seem to be an ideal solution to this problem. It allows the offenders to use their cars for essential driving while insuring that they do not drink and drive. Driving the interlock vehicle keeps them within the family of legal drivers and makes sure that they have third party insurance coverage. A key concern is whether the interlock prevents offenders from driving after drinking.

Our research and that reported in six other studies suggests that the interlock does this better than simply suspending the license as long as the device is on the car. Interlocks that conform to the NHTSA mechanical standards appear to prevent impaired driving of the interlock-equipped cars. Two features are critical to this: (1) The rolling retest that requires a breath sample every few minutes while the engine is running: This means that if the driver gets a parking lot attendant to get him started, he will have to put him in the right hand seat and take him along to continue to provide breath samples for as long as the vehicle is moving. (2) The data logger device records every breath test and every time the vehicle is operated. The recorder reveals any effort to subvert the interlock.

Thus, the primary threat to the effectiveness of the interlock is that the offender will drive a non-interlock car. In our current interlock study in Alberta, Canada, we found that despite the fact that one third of our interlock program participants had another non-interlock car in the family, participation in the interlock program still radically reduced their recidivism compared to fully suspended drivers who should not have been driving at all.

Why then should we not require all DUI offenders to install interlocks when convicted? One reason is that while the state has the full power to suspend the license, it lacks the power to force offenders to reinstate their licenses or to accept an interlock. The only incentive available to states is to allow the offender to drive the interlock vehicle legally. But, as I have noted, the evidence indicates that only a small proportion of DUI offenders reinstate their licenses when eligible to do so. It is not surprising, therefore, that the proportion of DUI offenders who opt to have the interlock installed on their cars is generally less than 10% in most states.

In contrast to the state motor vehicle departments, courts have additional power under their probation authority to motivate offenders to place an interlock on their vehicle. The implicit threat for failure to conform to a courts probation requirement is jail. Judge Richard Culver of Hancock County, Indiana has demonstrated how to motivate up to 90% of DUIs to install interlocks, using probation backed by a rarely required house arrest alternative for the few uncooperative offenders.

Given this background, what does our research suggest in regard to the bill you are considering? The program we studied in Alberta Canada is generally similar to the one provided in the current bill. Most second offenders had to serve a year of hard suspension prior to entering the interlock period for a second year. Based on our experience, you should expect that during the first hard suspension year, up to 10% of the offenders will commit another DUI and will have their suspensions extended so that they will not be eligible for the interlock program. These early

offenders are a high-risk group who will go on offending more frequently than those who survive the first year without a DUI conviction.

When the interlock program becomes available in the second year, 10% or less of the offenders will choose to install an interlock in order to drive legally. The rest will remain suspended and continue to drive illicitly. If the interlock program is well managed, those who elect this alternative will be less likely to recidivate than those who remain suspended.

Finally, in the third year, almost all of the interlock group will reinstate their licenses, while only a quarter to a third of the non-interlock offenders will reinstate their licenses, with the remaining offenders continuing to be suspended. If the legislation requires that the offender must be on the interlock for a year as a condition of reinstatement, this will increase the current disincentives to reinstatement and even fewer will elect to get their licenses back. Beginning in the third year, since the interlock group will no longer have this device on their cars and will be completely free to drive, they will have a higher recidivism rate than the non-interlock offenders who will still be fully suspended and limit their driving.

I hope this information is useful to you. I am prepared to answer any questions you may have.

Pergamon

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TEMPORARY VEHICLE IMPOUNDMENT IN OHIO: A REPLICATION AND CONFIRMATION

ROBERT B. VOAS*, A. SCOTT TIPPETTS and EILEEN TAYLOR

National Public Services Research Institute, 8201 Corporate Drive, Suite 220, Landover, MD 20785, USA

(Received 17 June 1997; in revised form 2 November 1997)

Abstract—Driving while suspended by individuals who have been convicted of an impaired driving offense is a significant highway safety problem. Such offenders present four times the risk of involvement in a fatal crash at a blood alcohol concentration (BAC) over 0.10. A previous report by the authors demonstrated that a vehicle immobilization program in Franklin County (Columbus), Ohio, significantly reduced driving-under-the-influence (DUI) recidivism rates for multiple DUI offenders. This study evaluated a somewhat different application of the same law in Hamilton County (Cincinnati), Ohio, where vehicles were impounded rather than immobilized, and obtained similar results—a reduction in repeat DUI offenses by multiple offenders both while their vehicles were being held by the police and after they were returned to the offenders. © 1998 Elsevier Science Ltd. All rights reserved

Keywords—Driving under the influence, Driving while suspended, Recidivism, Vehicle immobilization, Vehicle impoundment

INTRODUCTION

Of the 2558 drivers with a previous driving-under-the-influence (DUI) offense involved in fatal crashes in the U.S.A. in 1991, 1221 (or 48%) were suspended at the time of their fatal involvement (Fatal Accident Reporting System, 1991). If suspending the drivers' permits was fully effective, these drivers should not have been on the road. Because of the significance of this noncompliance problem, states have been enacting legislation directed at denying a vehicle to multiple DUI offenders or to DUI offenders who are apprehended when driving while suspended (Voas, 1992). Among the jurisdictions enacting such laws was the state of Ohio, which implemented a broad vehicle immobilization law applicable to multiple DUI and driving while suspended (DWS) offenders on 1 September 1993. An evaluation of the effectiveness of the application of that law in Franklin County, Ohio, found that immobilization reduced DUI recidivism, both while the vehicle was being held and after its return to the offender for a period of up to 2 years (Voas et al., 1997). This paper reports on a study of a somewhat different application of the same law in Hamilton County, Ohio, which includes the city of Cincinnati.

The period of immobilization provided by the Ohio law is 30 days for the first DWS offense, 60 days for the second and vehicle forfeiture for the third DWS offense. Second DUI offenders are subject to 90 days and third offenders to 180 days immobilization—and the vehicles of fourth offenders are subject to forfeiture. Franklin County used the immobilization provision in the majority of the cases adjudicated within the county by installing a club device to incapacitate the vehicles of offenders. On the other hand, Hamilton County, the site of the current study, simply kept the vehicles impounded throughout the applicable sanction period (see Table 1). The principal objective of the Hamilton County study was to provide an independent replication of the results of the evaluation of the immobilization law in Franklin County where significant reductions in repeat DUI and DWS offenses were found for offenders who received the vehicle immobilization sanction compared to offenders who did not. The prior study and the current evaluation were made possible because not all offenders who were eligible for the penalty received the sanction. This permitted the construction of comparison groups for those offenders who did receive the sanction.

METHODS

The study data for Hamilton County was constructed by drawing the full driving record, from the

*Corresponding author. Tel.: 001 301 9514233; Fax: 001 301 9078637; e-mail: voas@pire.org

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Table 1. DUI and DWS offenders receiving the vehicle impoundment sanction in Hamilton County between 1 September 1993 and 1 September 1995

	First DWS	Second DWS	Second DUI	Third DUI
Eligible	1129	275	1503	675
Received sanction	675	205	533	347
Percent sanctioned	59.8	74.5	35.5	51.4
Period of sanction (days)	30	60	90	180
Served less than half	206	38	95	72
Served one-half to three-quarters	57	17	11	34
Served full sanction period	412	150	427	241
Average exposure during sanction (days)	29.6	61.2	94.7	180.9
Average exposure after sanction (days)	400	361	345	334

state of Ohio driver record system, of every driver resident in Hamilton County who was convicted of a DUI or DWS offense between 1 September 1993 and 30 August 1995, and identifying those eligible under the immobilization law for a vehicle sanction. This file was then compared with records from the Hamilton County Mayor's and Municipal Courts and, in turn, with city police and sheriff department records to identify the eligible offenders who actually received the vehicle sanction.

Table 1 summarizes these data and gives the number of individuals in each category of offender who received the immobilization law penalty (served in an impoundment lot) in Hamilton County. As can be seen, more than half of the DWS offenders and between a third and a half of the DUI offenders in Hamilton County received the vehicle sanction appropriate to their offense. The imposition of the vehicle penalty occurred or did not occur for a number of factors. Some, such as administrative problems or the resources available to the police and prosecutors, were probably minimally related to the individual characteristics of the subjects and may not have biased the group comparisons. Other factors, such as offender choices (retaining a lawyer, pleading guilty, etc.) and differences between judges' sentencing practices, may have produced significant differences between the offenders whose vehicles were impounded and those who did not suffer this penalty. Age, gender and prior offenses were available for use as covariates for reducing the bias between groups. Gender was not employed because too few females were available in the sample.

For each offender category, the comparison group consisted of DUI or DWS offenders who were eligible to be impounded under the immobilization law but did not receive the vehicle sanction. In comparing their recidivism rates with those who did receive a sanction, the period for each comparison group was set to be equal to the average time of the sanction for the equivalent experimental (impounded) group. For the analysis of the period following release of the vehicles, the origin of the survival curves for both groups was set to correspond to the dates when the experimental group subjects retrieved their vehicles to avoid any carryover from the sanction period.

The average length of driving exposure when the vehicle was impounded and the average period of exposure after the offender retrieved his or her vehicle is shown in the lower section of Table 1. These are the periods during which repeat DUI or DWS offenses were analyzed using survival analysis. The power of these analyses depended upon both the number of offenders studied in each group and the average length of time in which a repeat offense could occur. Thus, for example, the shorter impoundment periods (30 and 60 days) for DWS offenders made it less likely that reductions in recidivism would be detected with these groups than for the DUIs for whom the length of impoundment was longer (90–180 days). The average period of exposure while the car was impounded was about equal to the sentence length (30, 60, 90 or 180 days). The average period of exposure following the return of the vehicle was relatively even for all groups (about 1 year). Therefore, the most important determinant of power for detecting change after the sanction period was the number of cases in the group.

Data analysis

Survival analysis is the method of choice for determining differences in recidivism (Lee, 1992). It uses all the subject/days available for analysis in the study database, thereby generally providing the greatest statistical power to detect change. It also allows comparison of rates as they change over the entire length of exposure (as opposed to one discrete, fixed period of exposure). In the recidivism example, one can test the survival (or hazard) rates of groups given different sanctions or against the rates of a baseline comparison group.

Two survival analysis procedures were employed in the present study: Cox Regression (Lee, 1992) and

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the Kaplan–Meier (Kaplan and Meier, 1958) procedures. Both procedures allowed for separate baseline survival/hazard functions for each of the four offender sanction groups (first DWS, second DWS, second DUI, third DUI) or strata, while the effect of the impoundment sanction compared to no vehicle action can be tested—either pooled across the four separate groups or separately within groups.

Kaplan–Meier tests the equality of survival functions for several groups in a manner analogous to nonparametric tests for differences among categorical distributions. With this method, the Tarone–Ware statistic was used for comparing the equality of survival distributions; the calculation of this test statistic weights all time points equally. Unlike Cox Regression methods, Kaplan–Meier does not assume proportional hazard rates across time between the subgroups being compared.

One limitation of the Kaplan–Meier method is that, unlike Cox Regression, it does not permit the use of covariates to adjust for prior differences between groups or to explain individual variation within groups in survival times/rates. Because random assignment was not possible, and there was evidence of differences in prior DUI and DWS offenses between groups (comparison groups had more priors), Cox Regression was used in addition to the Kaplan–Meier procedure to permit the application of covariates for age and prior record. In the current study, the Cox Regression and Kaplan–Meier methods yielded essentially similar results.

Four sentence lengths were analyzed: 30 and 60 days applicable to DWS offenders and 90 and 180 days applicable to DUI offenders. Two periods were separately analyzed: the sanction period when the offender's vehicle was impounded, followed by a post-sanction period of up to 2 years after the vehicle was returned. Two dependent variables were evaluated: DWS and DUI convictions. The relatively few fourth-time DUI offenders and third-time DWS offenders who were subject to vehicle forfeiture were not entered into the analysis.

RESULTS

Pooled results for all DUI and DWS offenders

The upper section of Table 2 presents the Cox Regression and Kaplan–Meier analyses of recidivism rates during the impoundment penalty period. These analyses found significant reductions in DWS offenses and DUI offenses when the 30- and 60-day DWS offender and 90- and 180-day DUI offender groups were combined for analysis. The effect size for each type of offense was about 40%. For both the Cox Regression analysis (which permitted the employment of covariate controls for age and prior record) and the Kaplan–Meier survival analysis (which does not assume proportional hazard rates), the reduction in the recidivism rate for the impounded groups was statistically significant at the one-in-a-thousand level. The lower section of Table 2 provides the results of the analysis of DWS and DUI offenses in the post-sanction period. Both the Cox Regression and the Kaplan–Meier analytical procedures resulted in significant reductions in both DWS and DUI offenses. The Cox Regression yielded an effect size of 25% for each type of offense.

Separate analyses by offender group

The upper portion of Table 3 shows that when offenses during the sanction period were analyzed separately for each offender group using the Kaplan–Meier survival analysis method, large reductions—varying from 44 to 84%—were found in the occurrence of DWS offenses for those whose vehicles were impounded compared to those who were eligible, but avoided this sanction. Despite the estimate that impounding the vehicle of third DUI offenders reduced the number of DWS offenses by 44% during the period the vehicle was being held, this difference was statistically insignificant. As shown in the lower portion of Table 3, large reductions in DUI offenses (44–100%) were also found for second DWS and DUI offenders during the period that the vehicles of the sanctioned offenders were being held. However, only the reductions for the second DUI offenders

Table 2. Overall impact of impoundment on combined groups in Hamilton County (Cox Regression and Kaplan–Meier analyses)

		Cox Regression						Kaplan–Meier	
Sanction period	Offense measured	*B*	*SE* (B)	Wald	*R*	*p*	Effect size[a] (%)	Tarone–Ware	*p*
During impound	DWS	−0.546	0.142	14.736	0.108	<0.001	−42.1	17.76	<0.001
	DUI	−0.490	0.157	9.819	0.092	0.002	−38.8	11.05	<0.001
After impound	DWS	−0.290	0.067	18.679	0.070	<0.001	−25.2	20.95	<0.001
	DUI	−0.283	0.092	9.381	0.061	0.002	−24.6	15.85	<0.001

[a]Proportional difference.

Table 3. Offenses by individual offender type during impoundment in Hamilton County (Kaplan–Meier analyses)

Offender type	Penalty days	Total group exposure (m)	Offense rate: Sanctioned (%)	Offense rate: Not sanctioned (%)	Effect size[a] (%)	Tarone–Ware	p
DWS offenses							
First DWS	30	942	0.6	2.2	−71	4.22	0.040
Second DWS	60	457	1.8	7.1	−74	4.39	0.036
Second DUI	90	4153	0.5	3.0	−84	9.18	0.002
Third DUI	180	3387	3.1	5.5	−44	2.39	0.122
DUI offenses							
First DWS	30	942	0.6	0.4	+42	0.14	0.713
Second DWS	60	457	0.0	2.9	−100	4.91	0.029
Second DUI	90	4153	0.7	3.2	−80	8.92	0.003
Third DUI	180	3387	2.7	4.9	−44	2.59	0.108

[a]Proportional difference.

were statistically significant. The impact of the sanction on the DWS offenses for first-time DWS offenders was in the wrong direction, but not statistically significant. On the other hand, for second DWS offenders, there was a large, statistically significant decrease in subsequent offenses.

Reductions in DWS and DUI offenses were also demonstrated in the post-sanction period (upper portion of Table 4). Effect sizes from 9 to 53% were obtained for DWS offenses and 28 to 58% for DUI offenses (lower portion of Table 4). The 56% reduction for the sanctioned second DUI offenders and the 58% reduction for the sanctioned third DUI offenders in the number of DUI offenses during the post-impoundment period were highly significant.

DISCUSSION

The major limitation in the current study, as well as the previous Franklin County study, is the inability to assign the vehicle penalty at random to eligible offenders. It is clear that the combination of administrative and personal factors that determine sanction versus nonsanction group membership resulted in some differences between groups that could have affected the study outcomes. In the present case, for example, the DUIs who were in the nonsanction group were more likely to have had a prior DUI offense than those who suffered vehicle impoundment (Table 2). While the Cox Regression analysis method used prior offenses as a covariate, it is possible that this procedure does not fully correct for the relationship between priors and recidivism or other factors not measured, and therefore not available for use as covariates, produced the differences observed.

Of particular interest and significance is the evidence that the effect of impoundment on DWS and DUI offenses persists beyond the length of the penalty period itself. It is not clear whether this is a deterrent effect (the cost and inconvenience of the penalty was so painful that the offender is motivated to avoid being caught again) or whether it is an incapacitation effect. Incapacitation could result from loss of the vehicle because some offenders who had

Table 4. Offenses by individual offender type after impoundment in Hamilton County (Kaplan–Meier analyses)

Offender type	Penalty days	Total group exposure (m)	Offense rate: Sanctioned (%)	Offense rate: Not sanctioned (%)	Effect size[a] (%)	Tarone–Ware	p
DWS offenses							
First DWS	30	12,764	8.6	15.7	−46	4.44	0.035
Second DWS	60	2857	12.5	13.7	−9	0.26	0.611
Second DUI	90	15,717	7.2	10.8	−33	1.92	0.166
Third DUI	180	5486	5.6	11.8	−53	4.17	0.041
DUI offenses							
First DWS	30	12,764	4.4	6.4	−32	1.67	0.197
Second DWS	60	2857	2.2	3.0	−28	1.64	0.200
Second DUI	90	15,717	3.6	8.0	−56	9.15	0.003
Third DUI	180	5486	4.0	9.5	−58	7.97	0.005

[a]Proportional difference.

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long impoundment periods may not have reclaimed their cars—possibly because the vehicle was worth less than the towing and storage costs. It is also possible that those drivers whose apprehension resulted in the impoundment of an employer's or spouse's vehicle may have been denied access to the vehicle after it was released. If future studies confirm the finding that the impact of vehicle impoundment continues after the sanction period is complete, the value of this penalty will be significantly enhanced. Overall, preventing the use of the vehicle by the offender for 1–6 months appears to be a promising sanction for DWS and DUI offenses.

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TEMPORARY VEHICLE IMMOBILIZATION: EVALUATION OF A PROGRAM IN OHIO[1]

ROBERT B. VOAS*, A. SCOTT TIPPETTS and EILEEN TAYLOR

National Public Services Research Institute, 8201 Corporate Drive, Suite 220, Landover, MD 20785, U.S.A.

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Abstract—Driving while suspended is a growing problem in most states. To deal with this problem, a number of jurisdictions are impounding and/or immobilizing the vehicles of driving while suspended or multiple driving under the influence offenders. This study evaluates the first 2 years of the implementation of this type of law in Franklin County (Columbus), OH. Variations in police enforcement and judicial sentencing policies resulted in some offenders, though eligible for impoundment or immobilization, not receiving the sanction. The recidivism rates of these offenders were compared with offenders who did receive a vehicle sanction. Tracking these two groups of offenders for up to 2 years demonstrated that the offenders who received the sanction had lower recidivism rates, both before and after they reclaimed their vehicles. © 1997 Elsevier Science Ltd.

Keywords—Driving under the influence, Driving while suspended, Vehicle immobilization, Vehicle impoundment, Recidivism

To date, *incapacitation* through license suspension has proved to be the most practical and effective sanction in reducing recidivism among drivers convicted of driving under the influence (DUI) of alcohol (Peck et al., 1985). *Deterrence* has largely failed because of the limited severity of sanctions that courts are willing to impose on drivers who have not caused serious injury to others. Further, sanctions appear to be less significant in producing deterrence to DUI than is the probability of apprehension (Ross, 1982). *Rehabilitation* through alcohol treatment programs has been shown to reduce DUI recidivism and alcohol-related crashes (McKnight and Voas, 1991; Wells-Parker et al., 1995) but has less overall impact on crash involvement than license suspension, which reduces non-alcohol-related as well as alcohol-related collisions (Peck et al., 1985).

The primary limitation on the effectiveness of license suspension is the inability of the police to enforce this sanction effectively. Offenders must be apprehended as a result of being stopped for another offense or at a sobriety checkpoint where the officers are examining licenses. While significant numbers of drivers are charged with the driving while suspended (DWS) offense, up to half or more of the drivers suspended for DUI do not re-instate their licenses when eligible to do so. This suggests that the current enforcement level is inadequate (Voas and McKnight, 1991; Sadler and Perrine, 1984). Because of the increasing numbers of drivers suspended for DUI and the relatively low probability of apprehension for DWS, the number of suspended drivers has been growing. The California Department of Motor Vehicles currently estimates that 1 million of the states' 20 million drivers are suspended.

Because of the difficulty in controlling this growing problem, the states have been examining the wider use of sanctions directed at the vehicles of suspended offenders. Voas (1992) surveyed state laws relating to vehicle sanctions such as registration cancellation, special plates for DUI offenders and vehicle impoundment and forfeiture. He found 35 states with vehicle sanction laws. For the most part, however, these actions were applied to few, usually the worst, offenders. None of these laws had been adequately evaluated.

Since that time, two studies have shown some impact on recidivism when vehicular usage was restricted. In Minnesota, the Department of Public Safety (1990) demonstrated that administrative confiscation of the license plates of vehicles owned by third-time DUI offenders was effective in reducing offenders' recidivism. The recidivism rate for violators receiving the police-issued impoundment order was 8 and 13% at 12 and 24 months, respectively. In con-

*Corresponding author.

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trast, the rate for violators not receiving the police-issued impoundment order was 16 and 26% at 12 and 24 months, respectively. Voas and Tippetts (1994) found that placing a sticker on the plates of vehicles operated by suspended drivers reduced DUI offenses as well as DWS recidivism.

In his review of state laws directed at the vehicles of DUI offenders, Voas (1992) found seven that provided for long-term (more than overnight) impoundment of the vehicle for a DUI or DWS. Impoundment was under-used, however, partly because the cost of storing a vehicle frequently exceeded its value. This resulted in abandoned vehicles for which the locality had to pay the towing and storage bills. One approach to resolving this problem was pioneered in the state of New Mexico (University of New Mexico, 1989), where magistrates immobilized a vehicle by means of a 'Denver Boot' instead of impoundment to prevent the DUI offender from driving. This offered the advantage of storing the vehicle on or next to the offender's property so that storage costs do not accrue. Furthermore, the locality or the department of motor vehicles could assess a service charge when the boot was removed.

For several years, the state of Ohio has had an immobilization law applicable to DWS offenders whose licenses were suspended for a DUI offense. This sanction, however, was only applied on a limited basis in a few of the smaller counties. A vehicle was usually immobilized by placing a club device on the steering wheel. In 1993, the Ohio Department of Public Safety funded a special project to support vehicle immobilization in Franklin County (Columbus), which has a population of >1 million. In the same year, the legislature extended the immobilization penalty to second- and third-time DUI offenders.

This new law strengthened the immobilization sanction by lengthening the time for multiple offenders: for a DWS offense—30 days for a first, 60 days for a second; for a DUI offense—90 days for a second and 180 days for a third. A third offense for DWS and a fourth offense for DUI are punishable by vehicle forfeiture. The law was further strengthened by providing that the vehicle must be seized and impounded upon arrest and held at least until an initial hearing that must be held within 5 days. To prevent offenders from circumventing the immobilization law, it was amended to prohibit offenders from registering another vehicle for 2 years if the 'offending vehicle' was sold or transferred without court approval between the time of arrest and the time the vehicle was immobilized.

The new legislation further provided for impounding the vehicle even if it was not owned by the offender. The non-offender, or 'innocent' owner, was only allowed to retrieve the vehicle if he or she could prove that he or she did not know the offender was using it or if he or she did not know the offenders' license was suspended. In April 1995, however, an Ohio district court ruled on a DWS appeal and found the 5-day hearing process to be unconstitutional if applied to an owner whose vehicle was driven by a third party. This decision did not prohibit the court from immobilizing the non-offender owner's vehicle upon conviction of the offender.

In Franklin County, the vehicles of DWS and DUI offenders are impounded and held for 5 days pending a hearing before a magistrate or judge to determine if the vehicle was seized legally. If legality is established, the judge may order the vehicle to remain impounded or immobilized until the trial. An order to immobilize means the vehicle would be moved from the impound lot to the offender's property where a club device would be placed on the steering wheel. Thus, most offenders receiving a vehicle sanction experienced both impoundment (for a short period) and immobilization. In either case, the offender is given credit from the date of arrest towards the number of days of the vehicle 'sentence'. An immobilization coordinator was added to the court staff to work with the police departments in Franklin County to handle the logistics and record-keeping of the program.

As in most court systems, application of the law by judges varied, which resulted in some offenders, though eligible for immobilization, not receiving the sanction. The reasons for variations in application of the law include the following: differing interpretations of the law by police, prosecutors and judges; the use of alternate, easier-to-process charging codes by some police; difficulty accessing and interpreting driver records to determine eligibility; dismissal or reduction of cases to ease prosecutor caseloads and paperwork. Further, lack of personnel and backlogs in the driver record system sometimes resulted in failure to impound eligible vehicles at the time of arrest. Finally, following the April 1995 court decision, vehicles not owned by offenders were no longer seized for impoundment upon the offender's arrest.

These variations in the processing of DWS and DUI cases resulted in variations in the use of vehicle impoundment and/or immobilization (VI/I) shown in Table 1. Approximately one in four eligible DWS offenders received the vehicle sanction while four out of ten second DUI offenders received this sanction. Those who received the sanction usually lost the use of their vehicles for the full period provided by law. As shown in Table 1, a greater percentage of eligible second-time DUI offenders received the sanction than

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Table 1. DUI and DWS offenders receiving the vehicle impoundment and/or immobilization (VI I) sanction between 1 September 1993 and 1 September 1995

	First DWS	Second DWS	Second DUI	Third DUI
Eligible	589	90	1649	456
Received VI I	136	21	685	134
% VI I	23.1	23.3	41.5	29.4
Period of VI I	30 days	60 days	90 days	180 days
Served $<\frac{1}{2}$	1	0	23	9
Served $\frac{1}{2}$ to $\frac{3}{4}$	4	2	18	10
Full period	131	19	644	115
Average length of sanction	29.5 days	58.0 days	87.3 days	167.5 days
Average time elapsed after sanction	360 days	421 days	367 days	329 days

did the third time DUI offenders. A possible explanation for this difference is that by the time these offenders had accumulated a third offense, they were less likely to own the vehicles they were driving.

As the impoundment and/or immobilization penalties were not applied to all offenders, a comparison of sanctioned offenders (the experimental group) with unsanctioned offenders (the comparison group) was possible. As in nearly all the legal penalties, random assignment to sanctioned versus unsanctioned groups was not possible in the present study. Most U.S. courts are unwilling to apply sanctions at random for research purposes. In the absence of random assignment, this study used covariate controls based on demographic and prior driving record measures to equate groups (Table 2). The mean values for each of the three covariates—age, prior DWS and prior DUI offenses—are shown for each of the four experimental and four comparison groups. Gender, though available, was not used because the small number of female offenders in the sample made use of this measure of little value for equating groups.

As can be seen in Table 2, there is a slight difference in age among the four experimental groups who received the immobilization penalty and the four comparison groups who did not. As might be expected, second-time DWS offenders have more prior DUI convictions than first-time DWS offenders. Overall, there is little difference between the experimental groups and the comparison groups. Where there are significant differences in prior DWS offenses among experimental and comparison groups, the effect of these differences should be reduced by the covariance procedure. Clearly, the effectiveness of the covariance procedure depends upon the identification of the major factors affecting recidivism that differentiate each of the four experimental groups from the corresponding comparison groups. The possibility that age and prior record do not adequately account for these factors remains a significant threat to the validity of the current study.

RESEARCH METHODS

With the cooperation of the Ohio Bureau of Motor Vehicles, the driving records of all Franklin County residents who had a DUI offense on their records between 1 January 1990 and 1 September 1995, were selected for analysis. The file included only DUI offenders because the immobilization law applied to multiple DUI offenders and DWS offenders whose licenses had been suspended for a DUI offense. (The immobilization law also applies to DWS offenders whose licenses were suspended for not having insurance, and DWS offenders whose vehicles were driven by a person who had no legal right to operate the vehicle. There were, however, too few cases for analysis.) These cases were merged with immobilization actions obtained from records kept by the immobilization coordinator. The records con-

Table 2. Mean values of measures used as covariates to control group differences in comparing the recidivism of immobilized offenders with offenders who did not receive that penalty

Covariates	30 day (First DWS)		60 day (Second DWS)		90 day (Second DUI)		180 day (Third DUI)	
	VI I	Compsn	VI I	Compsn	VI I	Compsn	VI I	Compsn
Age	30.8	29.8	30.1	31.9	33.6	33.2	35.4	34.0
prop. <25	0.348	0.383	0.286	0.286	0.168	0.212	0.090	0.128
prop ≥40	0.141	0.119	0.190	0.214	0.199	0.193	0.256	0.201
Prior DUIs*	0.513	0.404	0.688	0.694	0.834	0.872	1.240	1.271
Prior DWS*	0.479	0.451	0.673	1.115	0.210	0.268	0.272	0.388

*Within the most recent 3-year period only. Number of priors were log-transformed due to highly skewed distributions.

tained impoundment and immobilization orders and police activities related to installing and removing a club device.

The new impoundment/forfeiture law went into effect on 1 September 1993. Data for this study were collected over a 2-year period, from the law's inception until 1 September 1995. The period that post-offense driving records could be followed varied with the date of offense. Those offending in the fall of 1993 were followed for up to 2 years including up to 23 months or more following the period of immobilization, while those offending late in the study did not complete their initial impoundment and/or immobilization periods by the 1 September 1995, closing date. Driving records from the Bureau of Motor Vehicles were not extracted until November 1995 to insure that actions occurring through August of that year had been posted to the driver records. The average length of driving exposure when the vehicle was impounded or immobilized and the average period of exposure after the offender retrieved his or her vehicle are shown at the bottom of Table 1.

DATA ANALYSIS

Survival analysis is the method of choice for determining differences in recidivism (Lee, 1992). It uses all the subject-days available for analysis in the study database, thereby providing the best statistical power to detect change. Two survival analysis procedures were employed in the present study: the Cox regression and the Kaplan and Meier (1958) procedures.

Recidivism rates necessarily vary as a function of exposure time. Therefore, it is usually more meaningful to compare survival functions (i.e. cumulative recidivism plotted over time) since recidivism rates measured at a fixed exposure length might not be indicative of the overall dynamic of recidivist behavior. The Kaplan–Meier tests of equality allow the survival functions for several groups to be performed simultaneously. In the recidivism example, one can test the survival (or hazard) rates of groups given different sanctions, or against the rates of a baseline comparison group. With this method, the log-rank statistic is used for comparing the equality of survival distributions. All time points are weighted equally in this test. Unlike Cox regression methods, Kaplan–Meier does not assume proportional hazard rates across time between the subgroups being compared.

A limitation of the Kaplan–Meier method is that, unlike the Cox regression method, it does not permit the use of covariates to adjust for a priori differences between groups or to explain individual variation within groups in survival times and rates. Because random assignment was not possible, the Cox regression method was used along with the Kaplan–Meier procedure to permit the application of covariates for age and prior record. This procedure allowed for separate baseline survival and hazard functions for each of the four experimental (sanction) groups (or strata), while the effect of the action (impoundment and/or immobilization versus neither) is pooled across the four groups. In the current study, these two analytical methods yielded similar results.

Four experimental groups with different sentence lengths were analyzed: 30 and 60 days applicable to DWS offenders and 90 and 180 days applicable to DUI offenders. The relatively few fourth-time DUI offenders and third-time DWS offenders who were subject to vehicle forfeiture were not entered into the analysis. These four groups were studied across four different vehicle status conditions: impoundment only; immobilization only; impoundment and immobilization combined, and the period after sanction when no vehicle action was in effect. Two dependent variables were evaluated: the reoccurrence of DWS and DUI convictions.

The four comparison groups consisted of DUI or DWS offenders whose vehicles were eligible for impoundment and/or immobilization, but their vehicles were not sanctioned. In comparing their recidivism rates with those who did receive a sanction, the time for each of the comparison groups was set to be equal to the average time of the sanction for each of the corresponding experimental groups. For the analysis of the period following the release of the vehicles, the survival curves of both sets of groups originated at the time the experimental groups retrieved their vehicles to avoid any carryover from the sanction period.

RESULTS

The overall impact of the four sanction conditions—impoundment, immobilization, impoundment and immobilization combined, and the period following the retrieval of the vehicle—is shown in Table 3 using both the Cox regression and Kaplan–Meier methods to analyze the data.

The top section of Table 3 shows that for all four types of offenders considered together, impounding the vehicle marginally reduced the number of DWS offenses but not the number of DUI offenses. This marginal effect may be due to the relatively short time an offender's vehicle was normally impounded before it was transferred to immobilization status. Vehicle immobilization was in place for a larger portion of the total vehicle action period. Thus, it provided a better opportunity to demonstrate

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Table 3. Overall impact of VI/I on the occurrence of DWS and DUI offenses (Cox regression and Kaplan–Meier analyses)

		Cox regression*						Kaplan–Meier	
VI/I sanction	Offense	Coefficient	*SE*	Wald	*r*	*p*	Effect size (%)	Log rank	*p*
Impoundment	DWS	0.320	0.180	3.153	0.035	0.076	37.7	4.09	0.043
Impoundment	DUI	0.243	0.163	2.218	0.016	0.136	27.5	2.41	0.120
Immobilization	DWS	0.698	0.299	5.455	0.069	0.020	101.0	6.87	0.009
Immobilization	DUI	0.580	0.305	3.614	0.056	0.058	78.5	4.23	0.040
Combined	DWS	0.528	0.157	11.281	0.090	0.001	69.6	14.60	0.001
Combined	DUI	0.400	0.146	7.532	0.073	0.006	49.1	8.92	0.003
After	DWS	0.140	0.074	3.538	0.023	0.060	15.0	5.97	0.015
After	DUI	0.217	0.089	5.944	0.045	0.015	24.3	6.05	0.014

*All analyses based on 1 d.f. All residual χ^2 non-significant.
The Wald statistic shown in these tables is a measure of the significance of the dichotomous sanction variable (VI/I) when all other significant effects of the model are controlled.

a significant reduction in both DWS and DUI offenses. When the total period of vehicle action is evaluated by combining the impoundment and immobilization periods, both DWS and DUI offenses are significantly reduced in both the Cox regression and Kaplan–Meier analyses. Finally, when the up to 23 months 'after' period following the return of the offenders' vehicles is considered, both the number of DUI and DWS offenses are reduced in these pooled offender groups.

The Cox regression analysis indicated that the differences in recidivism between the two groups, both of whom were eligible for impoundment and/or immobilization, were generally large. In Table 3 for example, the DWS recidivism rate of those not immobilized was 100% higher than for those who did suffer that penalty.

Table 4 gives the results of the Kaplan–Meier analysis of the offense frequency for the four offender groups during the combined impoundment and immobilization periods. Since the vehicle was impounded at the time of apprehension, most offenders experienced both of these sanctions within the 30-, 60-, 90- or 180-day periods for which they were eligible. Combining the two sanctions produced a larger number of driver risk days that increased the significance of the difference(s) between the eligibles impounded and/or immobilized, and those who were not. The 30-day, first-time DWS offender group and the 90-day, second-time DUI offender group had significantly fewer DWS offenses, while the 90-day group had significantly fewer DUI offenses. Some of the differences fail to achieve statistical significance despite having impressive effect sizes (such as 100%). There are two reasons for this. First, the 60-day group had fewer cases combined with a very short exposure period that severely limited the statistical power needed to detect a real difference. Second, some of the offense rates for the comparison were so low that there is little room for improvement; so even a maximal reduction (for example, 0.7% versus 0% in DUIs for the 30-day group) may be too small to statistically reject the null hypothesis of no difference. Figure 1 shows the cumulative rate curve demonstrating a clear separation between those who received a vehicle sanction action and those who were eligible but did not.

Table 5 and Fig. 2 give the results of an analysis

Table 4. DWS and DUI offenses during immobilization and/or impoundment (Kaplan–Meier survival analysis)

		Total group exposure	Offense rate				
Offender type	Penalty days	(in months)	Sanctioned (%)	Not sanctioned (%)	Effect size (%)	Log rank	*p*
			DWS OFFENSES				
First DWS	30	134	0.0	3.6	100	4.68	0.031
Second DWS	60	41	0.0	7.4	100	1.48	0.223
Second DUI	90	1997	0.8	3.6	66	8.14	0.004
Third DUI	180	750	1.7	6.3	49	1.45	0.228
			DUI OFFENSES				
First DWS	30	134	0.0	0.7	100	0.87	0.352
Second DWS	60	41	0.0	2.9	100	0.59	0.443
Second DUI	90	1997	1.8	3.8	53	5.00	0.025
Third DUI	180	750	2.4	6.6	64	2.81	0.094

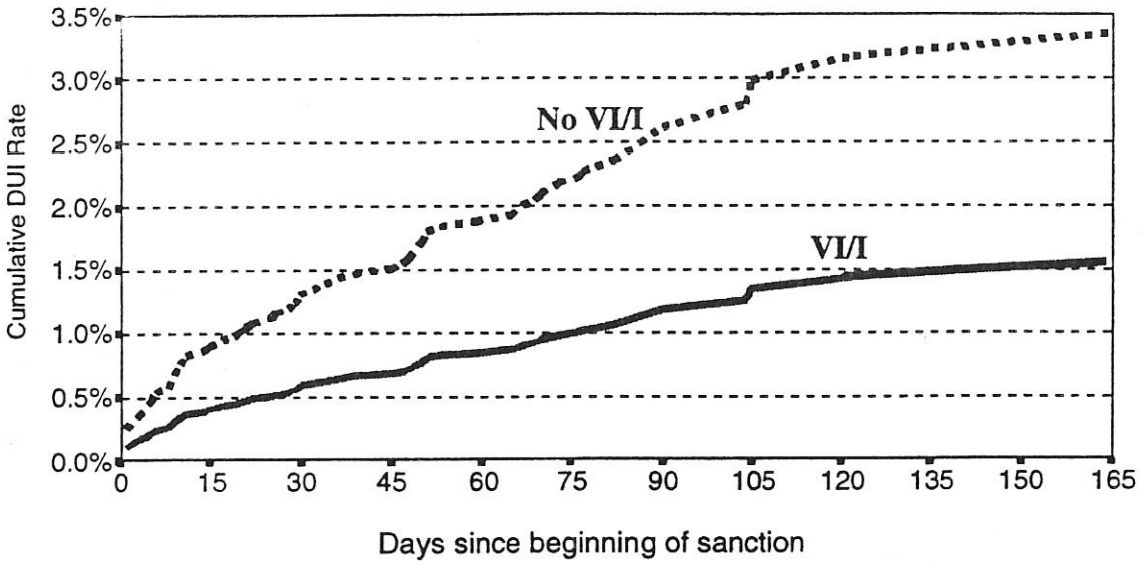

Fig. 1. Proportion committing DUI during vehicle impoundment and/or immobilization (VI/I) combined sanctions (pooled model fit, Cox regression analysis).

Table 5. DWS and DUI offenses after immobilization and/or impoundment (Kaplan–Meier survival analysis)

Offender type	Penalty days	Total group exposure (in months)	Offense rate		Effect size (%)	Log rank	p
			Sanctioned (%)	Not sanctioned (%)			
DWS OFFENSES							
First DWS	30	1609	13.2	17.1	23	0.77	0.381
Second DWS	60	267	17.6	14.7	−20	0.10	0.751
Second DUI	90	8205	6.8	11.0	38	3.17	0.075
Third DUI	180	1370	4.3	11.8	63	4.05	0.044
DUI OFFENSES							
First DWS	30	1609	5.1	6.4	21	0.21	0.644
Second DWS	60	267	0.0	3.1	100	2.07	0.150
Second DUI	90	8205	5.0	8.0	38	6.01	0.014
Third DUI	180	1370	7.3	9.4	23	0.03	0.865

for the period following the release of the impounded and/or immobilized vehicle. Evidently, impoundment and/or immobilization sanctions have a deterrent or at least a habituation effect on offenders. Overall, those offenders whose vehicles were actually impounded and/or immobilized had lower DUI offense rates *after* the termination of the sanction than did those eligible offenders who managed to avoid impoundment and/or immobilization. In addition, there was evidence that the second-time DUI, 90-day group demonstrated significantly lower DUI offense rates.

DISCUSSION

The principle limitation in these results is that the sanctions could not be assigned at random. Whether or not a vehicle penalty occurred was affected by a number of administrative factors and the resources available to the police and prosecutors. The differences in application of the sanction are probably minimally related to the individual characteristics of the subjects and more related to differences between judges and the resources available to the police and prosecutors. These factors undoubtedly produced differences between the two groups of offenders being compared. Two strong covariates—age and prior record—were the measures used to reduce the bias produced by the numerous factors that entered into the selection of those impounded and/or immobilized. Important variables not available for use in the analysis were education, income, employment status and socioeconomic class.

The validity of these results is clearly dependent on how adequately the two covariates accounted for the differences between the eligible offenders who

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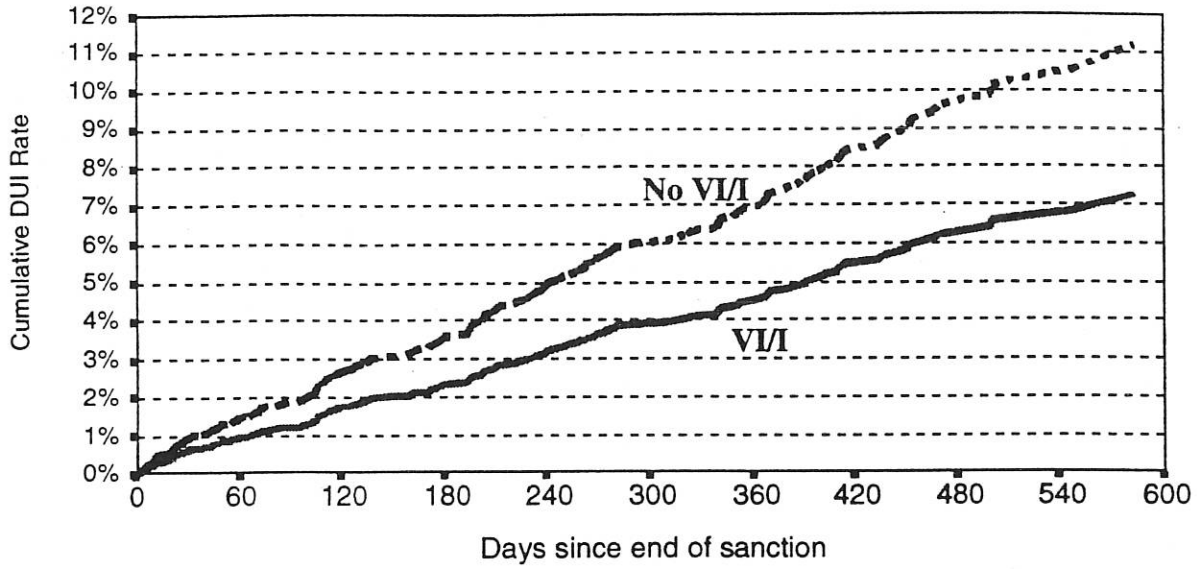

Fig. 2. Proportion committing DUI after VI/I combined sanctions (pooled model fit, Cox regression analysis).

received the sanction and those who did not. Therefore, caution is required in interpreting and extrapolating from these results. Nevertheless, the differences observed in the present study are large and the statistical methods robust, so it is reasonable to expect that current results will hold up in future validation studies.

Of particular interest and potential significance if confirmed by future studies is the evidence that the effect of impoundment and/or immobilization on DWS and DUI offenses persists beyond the length of the penalty period itself. This suggests that the temporary loss of a vehicle produced specific deterrence to driving once the vehicle was returned. However, there are alternative hypotheses that cannot be illustrated with the data available to the present study. The effect could be caused by offenders who had long periods of impoundment who did not reclaim their vehicles when eligible for release, possibly because the vehicle was worth less than the towing and storage costs. This could have resulted in offenders not having a vehicle to drive following the impoundment period. Another possibility is that those drivers whose apprehension resulted in the impoundment or immobilization of a friend's, a spouse's or an employer's vehicle, even for a short period, may have been denied access to the car after the vehicle was released. Few evaluations of incapacitation sanctions have produced evidence of a specific deterrent effect beyond the end of the sanction period. Therefore, it is important to validate the present results with further studies of the impact of vehicle impoundment and or immobilization on DUI offenders.

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