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DEPARTMENT OF MOTOR VEHICLES

AN EVALUATION OF THE EFFECTIVENESS OF IGNITION INTERLOCK IN CALIFORNIA

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OF THE STATE OF CALIFORNIA

IN ACCORD WITH ASSEMBLY BILL 762
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September 2004

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This study is one of two studies of ignition interlock in California mandated by the California Legislature (AB 762). The first study, published in 2002, was a process evaluation that examined the degree to which ignition interlock has been implemented in California. This current study is an outcome evaluation that examines the effectiveness of ignition interlock in reducing alcohol-related crashes and convictions, and crashes overall (alcohol and non-alcohol). The results of the study show that interlock works for some offenders in some contexts, but not for all offenders in all situatio ns. More specifically, ignition interlock devices work best when they are installed, although there is also some evidence that judicial orders to install an interlock are effective for repeat DUI offenders, even when not all offenders comply and install a device. California's administrative program, where repeat DUI offenders install an interlock device in order to obtain restricted driving privileges, is also associated with reductions in subsequent DUI incidents. One group for whom ignition interlock orders do not appear effective is first DUI offenders with high blood alcohol levels.

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PREFACE

This report is the second of a two-study evaluation of ignition interlock in California that was mandated by the California Legislature (AB 762 -Torlakson), and funded in part by the California Office of Traffic Safety. The report was prepared by the Research and Development Branch of the California Department of Motor Vehicles under the administrative direction of Clifford J. Helander, Chief. The opinions, findings and conclusions expressed in the report are those of the authors and not necessarily those of the State of California.

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INTRODUCTION

Background

The mixture of alcohol and driving presents a major public health problem in California. The California Highway Patrol reports that 1,308 people died and 31,806 were injured in alcohol-involved crashes in California in 2001 (California Highway Patrol, 2001).

While significant progress was made in reducing drunk driving during the 1980s and early 1990s, this progress stalled in the mid-1990s, and alcohol-related crashes have begun rising during the past couple of years. This reversal in the decline in drunk driving has prompted a renewed search for more effective countermeasures, one of which is ignition interlock devices, or IIDs.

IIDs are devices that consist of an alcohol breath testing unit that is linked to the ignition switch of a motor vehicle. The vehicle cannot be started until the driver provides a breath sample, and if the sample contains more than a predetermined amount of alcohol, the device locks the vehicle's ignition, thereby preventing the person from driving that vehicle.

IID Programs & Evaluations

A number of states developed and implemented pilot-IID programs beginning in the mid-1980s, including California, which was the first state to enact legislation that authorized judges to order DUI offenders to install IIDs (Fulkerson, 2003). A number of these pilot programs were evaluated, but only a handful of the studies were done with sufficient methodological rigor to yield reliable results.

The studies evaluating ignition interlock programs generally examined the efficacy of the devices in reducing driving-under-the-influence (DUI) recidivism, and the results are somewhat mixed. Evaluations of IID programs in Oregon and California did not find the programs to be effective, while studies of IID in Ohio, Maryland, North Carolina, Alberta Canada and Sweden do show that IIDs can reduce DUI recidivism (Beck et al., 1999; Bjerre, 2003; Elliot & Morse, 1993; EMT Group, 1990; Jones, 1992; Popkin et al., 1992; Weinrath, 1997). While the results of these IID studies are somewhat mixed, the preponderance of evidence suggests that IIDs are effective in reducing DUI recidivism, by as much as 40-95%, at least as long as they remain installed on vehicles (International Council on Alcohol, Drugs & Traffic Safety, 2001). Most of the studies showing positive effects of IIDs also show that there is no social learning associated with the devices—that is, once removed from the vehicle, recidivism climbs back up.

Ignition Interlock in California

The first use of IIDs in California was authorized by the Farr-Davis Safety Act of 1986, which established a pilot program in four counties in the state where judges could order DUI offenders to install an interlock device on their vehicles as a condition of probation. The law also mandated that the pilot program be evaluated, and the results showed IID to be ineffective (EMT Group, 1990). Despite this, subsequent legislation (AB 2040, Farr) authorized the use of interlock devices statewide. Like the Farr-Davis Safety Act, this new law allowed judges to discretionarily order IIDs for DUI offenders. However, it soon became clear that judges were not using interlock as a sentencing option for most eligible DUI offenders, so the Legislature enacted AB 2851 (Friedman) in 1993, which eliminated the discretionary nature of the previous interlock law, and required judges to order IIDs for all repeat DUI offenders. Even with this new mandatory law, judges ordered IIDs for only 20-25% of repeat DUI offenders.

In order to develop a more robust interlock program in California that had sufficient numbers of participants to enable an evaluation of the effectiveness of the devices, the Research and Development (R&D) Branch at the Department of Motor Vehicles (DMV) convened an interagency task force to critically examine the interlock laws, and recommend changes. As a result of this effort, the California Legislature enacted AB 762 (Torlakson), which shifted the focus of "mandatory" IID law from repeat DUI offenders to drivers convicted of driving on a DUI-suspended driver license (DWS-DUI). The rationale behind this shift is that while DUI offenders with suspended driver licenses may or may not continue to drive in violation of their suspension, DWS-DUI offenders have already demonstrated that they will drive and pose a risk on the highways, and thus need more corrective measures. This shift in focus was in response to judicial concerns over the logical inconsistency of prior law.

Although the Legislature has enacted subsequent legislation concerning IID (AB 2227, Torlakson), the thrust of AB 762 remains intact. Under the current IID laws, judges must order IIDs for DWS-DUI convictees, and for drivers arrested for DWS-DUI who are convicted of a less serious driving while suspended (DWS) offense. Judges may also order IIDs for DUI offenders at their discretion. In addition to this judicial IID program, there is an IID early reinstatement program administered by the DMV. Under this administrative program, multiple DUI offenders may, after serving half of their license suspension or revocation period, install an IID and apply to the DMV for a restricted driver license. These IID laws became effective July 1999.

The legislation that created the current IID program also contains a provision that requires the DMV to conduct two rigorous, scientific evaluations of IIDs and report the findings to the Legislature. The first evaluation is a process study, which examines the degree to which interlock laws have been implemented in California. This study was completed and delivered to the Legislature in July 2002. The results of the process evaluation showed that the ignition interlock laws have been poorly implemented;

judges still order IIDs for only a fraction of the DWS-DUI offenders who are required by law to receive such an order, only a minority of offenders ordered to install an IID do so, and few repeat DUI offenders opt to shorten their license suspension term by installing an IID and applying to DMV for a restricted driver license (DeYoung, 2002). While some recommendations were made in the final report of the process study for changes in court reporting of IID orders and the monitoring of offenders ordered to install an IID, the main recommendation was to delay further modifications to California's interlock laws until the results of the second study, an outcome evaluation, were available to guide any changes.

This report describes this second, Legislatively-mandated study, of California's ignition interlock program. It employs the most rigorous methods possible to evaluate the effectiveness of IIDs in reducing DUI recidivism and improving traffic safety in California. The results of this study, combined with those of the Legislatively-mandated process study of IIDs, provide important information that can guide law and policy regarding the most effective and efficient use of ignition interlock in California.

RESEARCH METHODS

California's ignition interlock laws prescribe and authorize the use of IIDs for different offenders in different situations, so that California's ignition interlock program is really several different programs. Two examples are that (1) judges are required to order IIDs for DWS-DUI offenders, and (2) multiple DUI offenders can choose to end their license suspension or revocation term early by installing an IID. Because of this, the outcome evaluation is comprised of six different studies, each of which assesses the effectiveness of IIDs for different types of offenders, with the devices used in a specific context. Taken together, these six studies provide a comprehensive picture of the effectiveness of IIDs as a traffic safety countermeasure in California. The six studies are described below.

1. DWS-DUI offenders with an IID order or restriction. This sample, identified using court conviction data on DMV records, consists of drivers convicted of DWS-DUI who are ordered by the court to either install an IID, or restricted to driving only an IID-equipped vehicle (e.g., they do not own a vehicle). This study can be considered an evaluation of California's current IID program, and thus is of central importance.

2. DWS-DUI offenders with an IID order. This sample of drivers was initially identified using DMV's driver license database, and then tracked back to the adjudicating court. It differs from the first study in that it only evaluates the effectiveness of court orders to install an IID, ignoring IID restrictions.

3. DWS-DUI/DUI offenders installing an IID. This sample consists of drivers who actually installed an IID, and was obtained from records maintained by ignition interlock providers. It differs fundamentally from the other studies by focusing on the efficacy of the devices themselves, rather than the effectiveness of California's interlock program and laws. Thus, this study provides information about whether the devices, when installed, can reduce DUI recidivism; this is fundamental, because if the devices are ineffective when installed, no IID program is likely to be effective.

4. DUI first offenders with IID order or restriction. This study is similar to the first one in that it evaluates California's interlock program, but this study focuses on the effectiveness of IIDs for first DUI offenders (rather than DWS-DUI offenders). This sample was developed using DMV's driver record database.

5. DUI second offenders with IID order or restriction. This study is similar to study 4, but differs from it by focusing on second DUI offenders. Like study 4, it examines judges' discretionary use of IIDs for DUI offenders, when judges either order offenders to install a device, or restrict their driving to only vehicles equipped with an IID.

6. DUI second offenders installing an IID. This study is unique in that it examines the effectiveness of California's discretionary IID program, where multiple DUI offenders can, after serving half of their period of license suspension, install an IID in their vehicle in order to obtain a restricted driver license from DMV.

This study can be termed a quasi-experiment, in that it was not possible to randomly assign offenders to either an IID group or comparison group. Drivers were sampled from DMV records (except for drivers in study 3, who were sampled from ignition interlock provider records) if they had a DWS-DUI or DUI conviction, or had an IID installed on their vehicle, between January 2000 and January 2003. Based on their driver record, drivers were assigned to the IID group if their record indicated that they had an IID order/restriction/installation during the study period, or to the comparison group if they had no such order/restriction/installation.

The effectiveness of ignition interlock was assessed by comparing the rates of subsequent DUI convictions and crashes between the IID and comparison groups. A third outcome measure, subsequent DUI incidents, which represents DUI convictions, alcohol-related crashes, and Administrative Per Se (APS) actions, was also examined. The results based on DUI incidents were very similar to those for DUI convictions for 4 of the 6 studies, and for the sake of brevity, the results for DUI incidents are only discussed for the two studies where they differed from those for DUI convictions. A type of survival analysis, Cox regression, was used to determine whether there was a significant difference between the interlock and comparison groups on subsequent DUIs and crashes. This technique uses the number of days to first subsequent incident,

in the case of this study, the first subsequent DUI conviction or crash, to establish group survival rates; the rates of the groups can then be compared over time.

Because it was not possible to randomly assign offenders to IID or comparison groups, there is a possibility that the groups were not equivalent to begin with, and that this non-equivalency biased the results. To mitigate as much of this potential bias as possible, statistical controls were used on two levels. First, the comparison group was formed by matching comparison drivers to IID drivers based on propensity scores, which were formed using data on prior driving and demographics; this helped to ensure that the comparison drivers were as similar as possible to drivers in the IID group (Rosenbaum & Rubin, 1985). In addition, statistical controls were used in the analyses of the data, by including information on drivers' demographics and prior driving record. While it is impossible to know whether all significant biases were controlled, the statistical controls and design that were employed did control bias on those dimensions for which information was available. The consequence of this is that the results should be viewed as showing the relationship between interlocks and subsequent DUIs and crashes, not as proving that the devices cause more or less subsequent DUIs/crashes.

RESULTS AND DISCUSSION

Study 1: DWS-DUI Offenders with an IID Order or Restriction

Cox regression models were developed to assess the relationship between IID orders/restrictions and subsequent DUI convictions and crashes, using covariates based on demograhics and prior driving record to control for pre-existing differences between the IID and comparison groups. The Cox model for subsequent DUI convictions showed that there was no significant difference between the groups on subsequent DUI convictions.

The final Cox regression model for subsequent crashes showed that there was a statistically significant difference between the IID and comparison groups on subsequent crashes. The hazard ratio from the model, which indicates the relative risks of the groups, indicated that the IID group had a 24% lower risk of a subsequent crash than the comparison group. These results are shown in Figure 1, below, which shows the proportion in each group surviving (i.e., having no subsequent crash) on the vertical axis, at each follow-up day in the study, shown on the horizontal axis. A <u>lower</u> risk of subsequent crash for a group would be indicated by a line for the group that is <u>higher</u> on the graph, since a greater proportion would be surviving without a subsequent crash.

Figure 1 clearly shows that drivers receiving an IID order/restriction survive longer before becoming involved in a subsequent crash than drivers not receiving an IID order/restriction. Drivers in the IID group are less likely to have a subsequent crash than comparison group drivers almost from the beginning of the study, the point at which all drivers were convicted of DWS-DUI, and drivers in the IID group were ordered to install an IID or were restricted to driving an interlock-equipped vehicle.

These results for DWS-DUI drivers ordered to install an IID or restricted to driving a vehicle with an IID are mixed. The expected effect that an IID order/restriction issued by the court would result in a lower rate of subsequent DUI convictions was not observed. However, drivers issued IID orders/restrictions did have fewer subsequent crashes, which is a significant traffic safety effect.

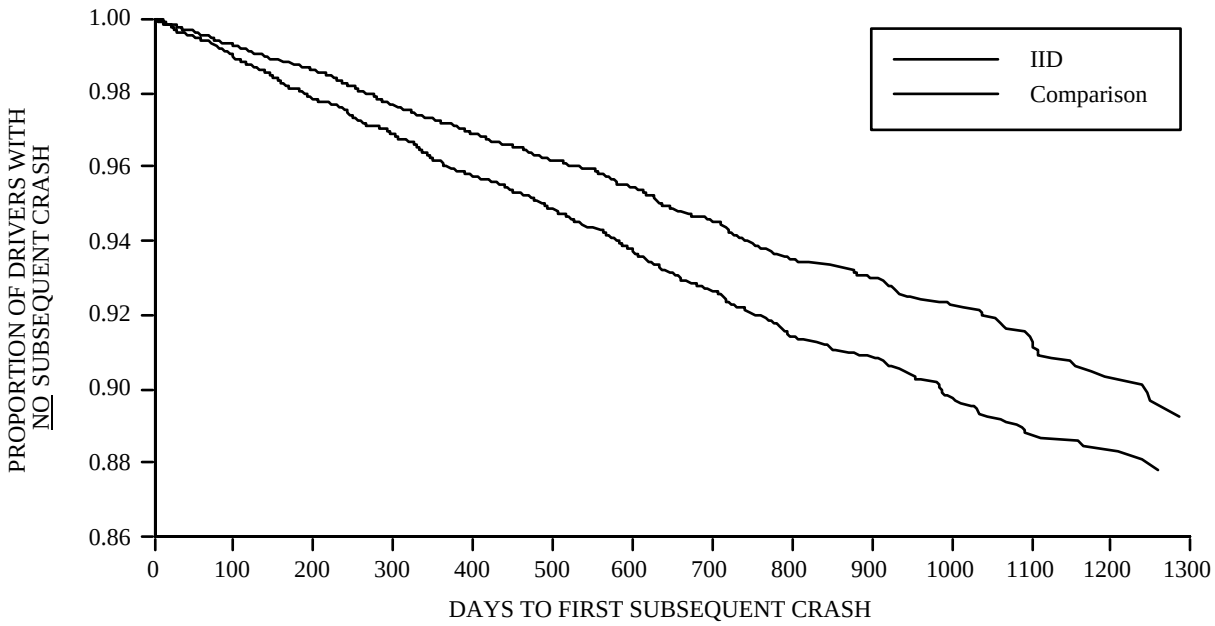

Figure 1 . Final survival model: Number of days to first subsequent crash for drivers receiving an IID order/restriction versus drivers not receiving an IID order/restriction.

Study 2: DWS-DUI Offenders with an IID Order

Cox regression models were developed to test the association between the receipt of a court order to install an IID, and subsequent DUI convictions and crashes. The model for subsequent DUI convictions showed that there was no significant difference in subsequent DUIs between DWS-DUI drivers ordered to install an IID, and drivers not receiving an order.

The Cox model developed to examine subsequent crashes showed that there was a significant difference between the IID and comparison group on this measure, and also that the difference between the groups changed over the course of the study. The hazard ratio from the model indicated that DWS/DUI drivers ordered to install an IID had a subsequent crash risk that was 42% lower than that of drivers not receiving an IID order. The results of this can be seen graphically in Figure 2, below.

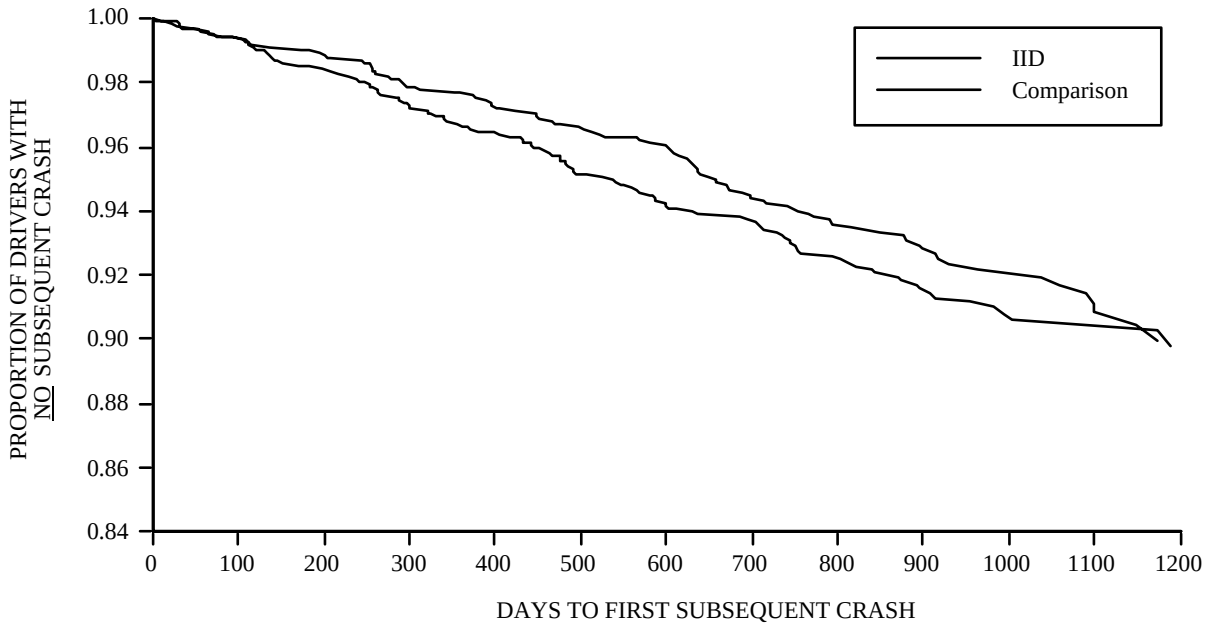

Figure 2 . Final survival model: Number of days to first subsequent crash for drivers receiving an IID order versus drivers not receiving an IID order.

Figure 2 shows that, after about 150 days, a greater proportion of drivers in the IID group remain crash-free, compared to drivers in the comparison group. This difference is unlikely to have occurred by chance.

The results of this study are quite similar to those from study 1. They show that DWS-DUI drivers receiving an order from the court to install an IID have, relative to drivers not receiving an IID order, about the same risk of a subsequent DUI, but a lower risk of a subsequent crash.

Study 3: DWS-DUI/DUI Offenders Installing an IID

This study examined the relationship between installation of an IID and subsequent DUI convictions and crashes. The final Cox regression model showed that DWS-DUI/DUI drivers who installed an IID had a significantly lower risk of a subsequent DUI conviction than those who did not install an interlock device. The hazard ratio from the model showed that drivers in the IID group had a risk of subsequent DUI that was 18% lower than that of drivers in the comparison group. This effect can be seen visually in Figure 3, presented below.

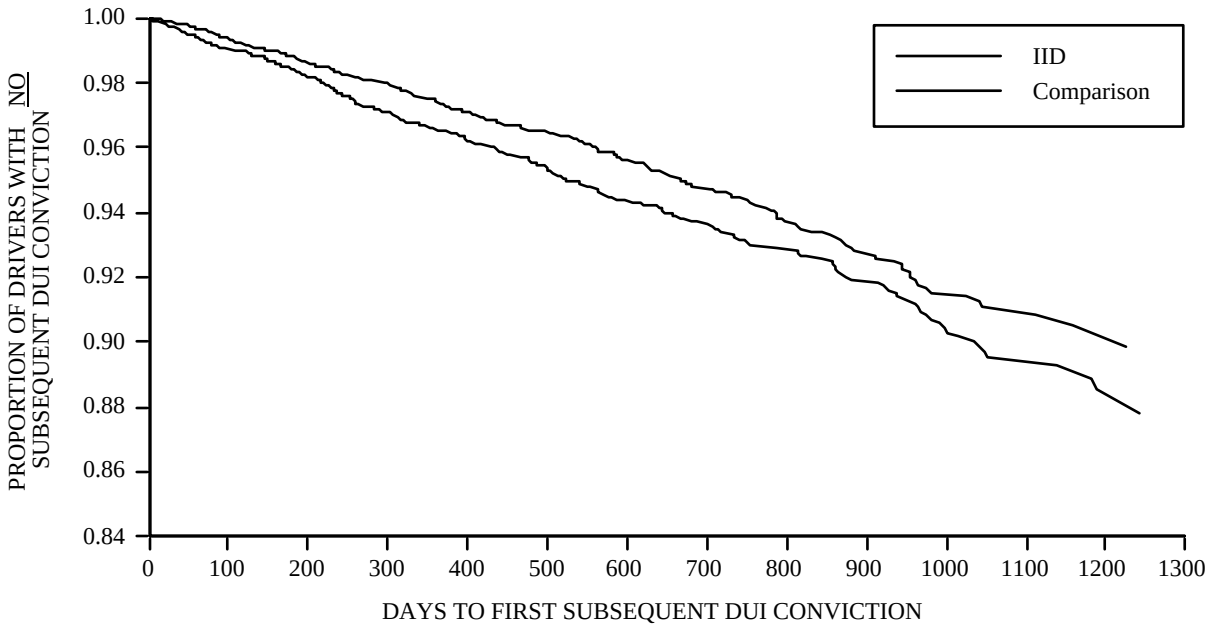

Figure 3 . Final survival model: Number of days to first subsequent DUI conviction for drivers installing an IID versus drivers not installing an IID.

It is clear from Figure 3 that drivers installing an IID have a better chance of surviving without a subsequent DUI conviction, relative to drivers not installing an IID; this difference between the groups is evident throughout the study period.

Because drivers installing an IID, unlike drivers in the other studies, were a mix of DWS-DUI and DUI offenders, further analyses were conducted to determine whether the positive effects of IID installation differed, depending upon whether the driver was convicted of DWS-DUI or DUI. The subanalyses examining DWS-DUI offenders showed that drivers installing an IID had a significantly lower risk of a subsequent DUI conviction than drivers not installing an IID. No such differences were found for DUI offenders, suggesting that IID installation is more effective for DWS-DUI offenders than it is for DUI offenders.

When crashes were examined, the Cox regression models showed that there was a significant difference between the groups on subsequent crashes. However, the hazard ratio for the model indicated that the risk of a subsequent crash was higher for drivers installing an IID, compared to drivers not installing a device; drivers installing an IID had a risk of a subsequent crash that was 84% higher than drivers not installing an IID. These results are portrayed in Figure 4, below.

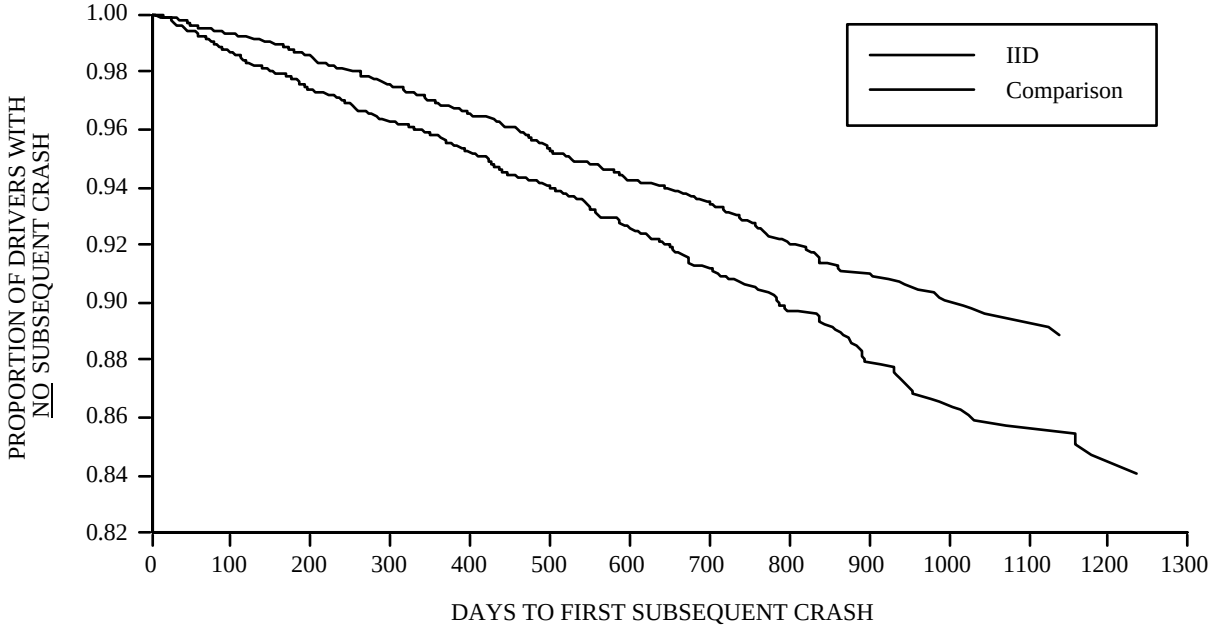

Figure 4 . Final survival model: Number of days to first subsequent crash for drivers installing an IID versus drivers not installing an IID.

It is clear from Figure 4 that DWS/DUI drivers installing an IID have a higher risk of a subsequent crash, as a smaller proportion of them survive crash free, compared to those not installing an IID. This difference between the groups is evident throughout the study.

As with subsequent DUI convictions, further analyses were done on crashes to determine whether the relationship between IID installations and crashes was different for DWS-DUI offenders than it was for DUI offenders. The results indicted that the association between IID installation and crashes was the same for both DWS-DUI and DUI offenders.

The results from this study are mixed. Drivers installing an IID have a lower risk for a subsequent DUI conviction than drivers not installing an IID, indicating that the IIDs prevented DUI recidivism, as designed. IIDs seem to work better at reducing subsequent DUIs for DWS-DUI offenders than for DUI offenders. However, on the important traffic safety issue measure of crashes, drivers installing an IID had a higher

risk of subsequent crash than did drivers not installing an IID. The relationship between IID installation and crashes is the same for both DWS-DUI and DUI offenders.

Study 4: DUI First Offenders with an IID Order or Restriction

Cox regression models developed for the first DUI offenders in study 4 showed that offenders who were either ordered to install an IID, or restricted to driving an interlock-equipped vehicle, had a risk of a subsequent DUI conviction that was not significantly different than offenders not receiving such an order or restriction.

The statistical models developed to examine crashes also showed that there was no significant difference in subsequent crashes between first DUI offenders who received an IID order or restriction from the court and first offenders who did not receive an IID order/restriction.

The results of study 4 indicate that a court-prescribed IID order or restriction for first DUI offenders, all of whom had elevated blood alcohol content (BAC) levels, is not associated with reductions in subsequent DUI convictions or crashes. This calls into question the utility of using IIDs for first DUI offenders.

Study 5: DUI Second Offenders with an IID Order or Restriction

Cox regression models were developed to test the relationship between IID orders/restrictions prescribed by courts for second DUI offenders, and subsequent DUI convictions. These statistical models showed that, while there was a difference in subsequent DUIs between offenders ordered to install an interlock/restricted to driving an IID-equipped vehicle, and second offenders not receiving an IID order/restriction, these differences approached, but did not reach statistical significance (p = .085). This could be restated to say that the results <u>suggest</u> that a court-issued IID order/restriction for second DUI offenders is related to a lower risk of subsequent DUI conviction, but do not confirm such a relationship. This finding is shown below, in Figure 5.

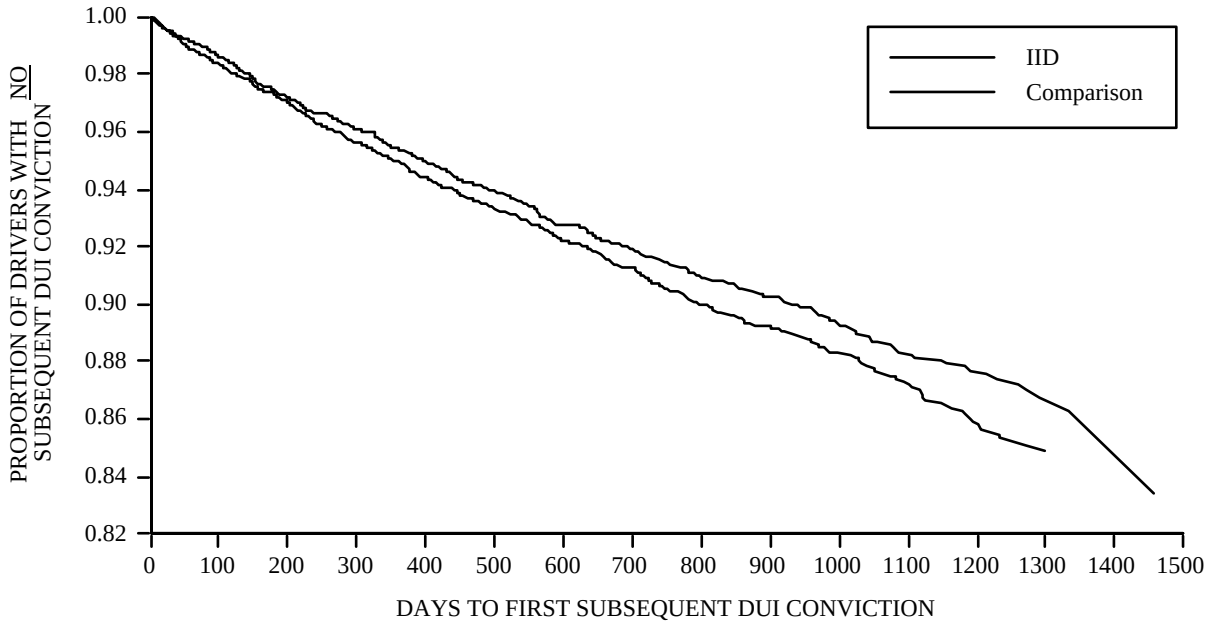

Figure 5 . Final survival model: Number of days to first subsequent DUI conviction for second offenders receiving a court IID order/restriction versus second offenders not receiving an IID order/restriction.

Figure 5 shows that a greater percentage of second DUI offenders receiving an IID order/restriction survive, or do not receive, a subsequent DUI conviction, relative to second offenders not receiving an IID order/restriction. However, as mentioned above, because these results were not quite statistically significant, they suggest, rather than confirm, that a court IID order/restriction is associated with a lower risk of subsequent DUI conviction.

It was mentioned in the methods section of this report that, for each of the six studies, Cox regression models were also developed to examine subsequent DUI incidents, (which consist of DUI convictions, alcohol-related crashes and APS license suspension actions due to a DUI arrest). For all but two of the studies, the results for subsequent DUI incidents closely mirrored those for subsequent DUI convictions, and so are not reported, but for two studies they are different enough to warrant mentioning; this is one of those two studies.

The statistical models developed to examine subsequent DUI incidents for second DUI offenders showed that there was a significant difference between drivers in the IID

order/restriction group and drivers in the comparison group. The hazard ratio from the model indicated that drivers receiving an IID order/restriction had a 13% lower risk of subsequent DUI incident than drivers not receiving an IID order/restriction.

The final measure examined in this study was crashes. The Cox regression models showed that there was a significant difference in the risk of a subsequent crash between second DUI offenders receiving an IID order/restriction and second offenders not receiving such an order/restriction. The hazard ratio from the model indicated that drivers in the IID order/restriction group had a 19% lower risk of a subsequent crash than drivers in the comparison group. These results are shown below in Figure 6.

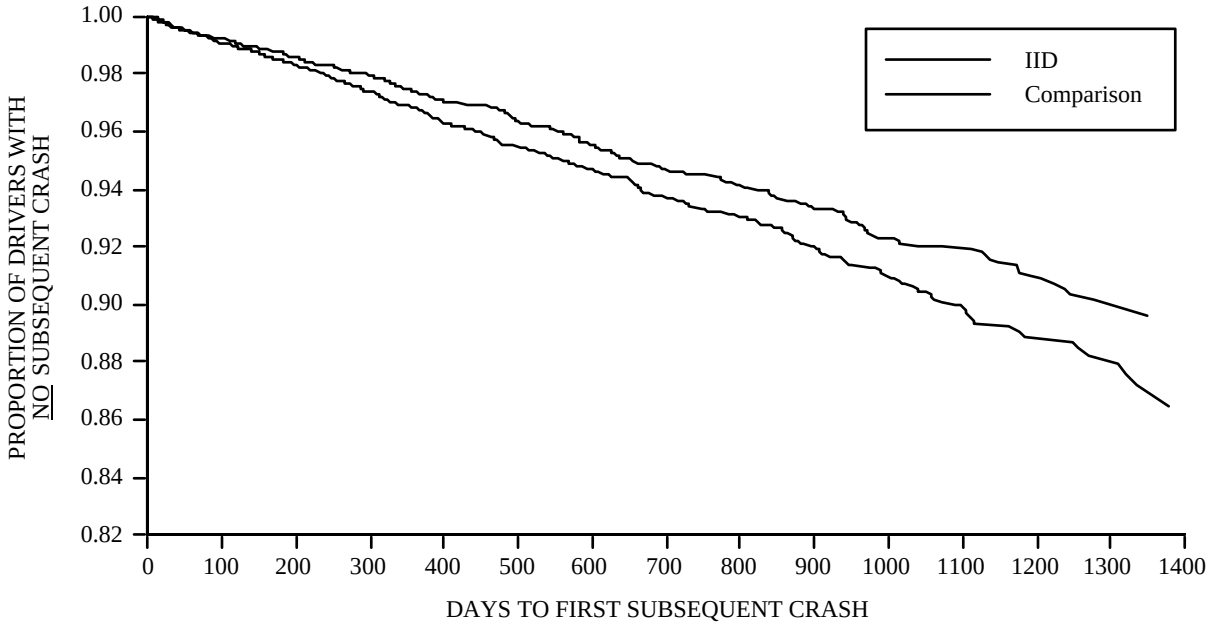

Figure 6 . Final survival model: Number of days to first subsequent crash for second offenders receiving a court IID order/restriction versus second offenders not receiving an IID order/restriction.

Figure 6 shows that second DUI offenders receiving an IID order/restriction have a lower risk of a subsequent crash than drivers who do not receive an IID order/restriction.

The results from this study suggest that court orders to install an IID, or restrict driving to an interlock-equipped vehicle, are associated with reductions in alcohol-related

crashes and convictions, as well as crashes in general, for second DUI offenders. While the results for DUI convictions were only suggestive, those for DUI incidents were statistically significant, indicating that it is likely that there is a real association between court-prescribed IID orders/restrictions, and reductions in DUI recidivism.

Study 6: DUI Second Offenders Installing an IID

Cox regression models were developed to assess whether second DUI offenders who served half of their license suspension period, and then installed an IID in order to obtain a restricted driver license, had different risks of subsequent DUI convictions and crashes than second offenders who remained suspended. The results from the statistical analyses indicated that there was a directional, but not statistically significant (p = .077), relationship between the installation of an IID and reduced risk of a subsequent DUI conviction. Thus, the results of this analysis are suggestive, rather than confirmative. This is shown in Figure 7.

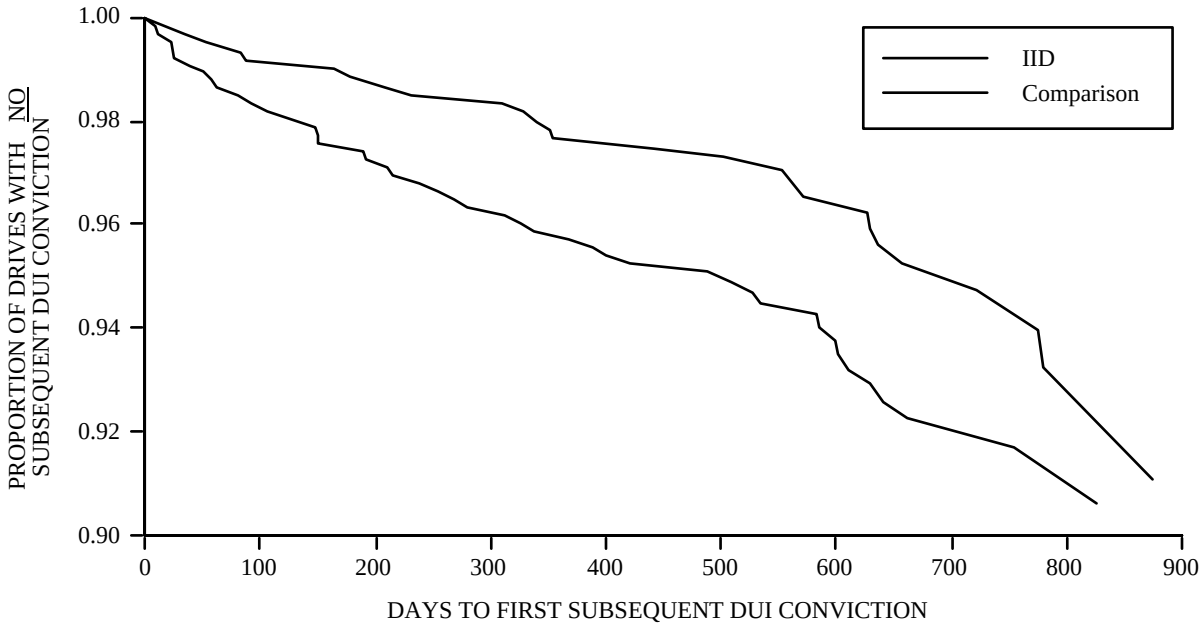

Figure 7 . Final survival model: Number of days to first subsequent DUI conviction for second offenders installing an IID with license restriction versus second offenders not installing an IID with license suspension.

Figure 7 shows that those second offenders installing an IID have a directionally lower risk of subsequent DUI conviction than second offenders who chose to remain suspended.

Like study 5, the results of statistical analyses of subsequent DUI incidents undertaken in this study were statistically significant. The results indicated that second DUI offenders installing an IID had a 41% lower risk of a subsequent DUI incident than second offenders not installing an interlock and remaining suspended. This finding, plus the fact that the small sample size in this study may have limited statistical power in the analysis of DUI convictions, suggests that there may also be a significant effect of IID installation in reducing subsequent DUI convictions.

The final measure examined in this study was crashes. The statistical modeling showed that there was a significant difference between the IID installed and suspended second offender groups, but this time the findings were reversed; second DUI offenders installing an IID had a 130% higher risk of a subsequent crash than suspended drivers. This is shown in Figure 8.

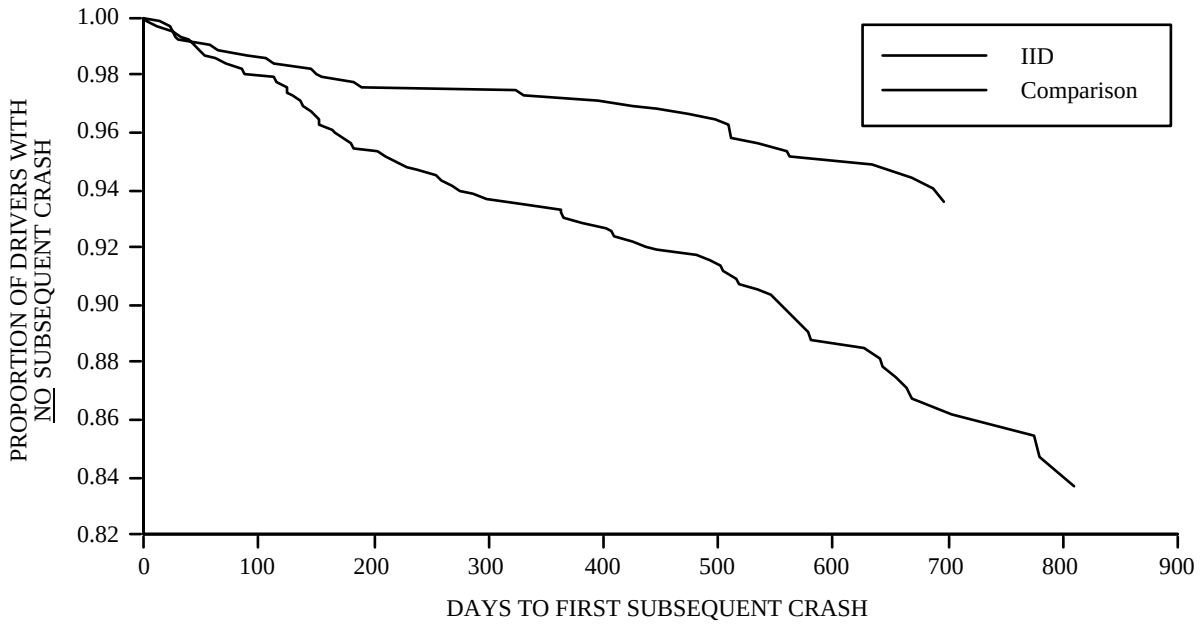

Figure 8 . Final survival model: Number of days to first subsequent crash for second offenders installing an IID with license restriction versus second offenders not installing an IID with license suspension.

The findings of IID installation for second offenders choosing to install an interlock device in order to shorten their period of license suspension were mixed. The IID is designed to prevent driving after drinking, and the results on subsequent DUI incidents and subsequent DUI convictions suggest that they may be effective in this regard. However, second offenders installing an IID have a significantly higher risk of a subsequent crash than second offenders who remain suspended.

CONCLUSION AND RECOMMENDATIONS

The results from this study are mixed. They show that IIDs can be effective in reducing DUI recidivism, but not in all situations or for all offenders. When DUI recidivism is examined, the results indicate that IIDs are effective in reducing subsequent DUI convictions when they are actually installed on offenders' vehicles, but that requiring judges to order offenders to install interlock devices and/or restrict offenders to driving IID-equipped vehicles generally has little effect. To the extent that most other studies of interlock have focused on situations where the devices are actually installed, the findings from this study are in accord with prior research.

Thus, it could be said that IIDs are efficacious, but not necessarily effective, or that the devices themselves can work, but that programs utilizing them are more problematic. This is certainly the case in California, where after almost two decades of experience with interlocks, a truly effective program has yet to be developed. The findings from the process evaluation of California's program show that judges do not order most DWS-DUI offenders to install an IID, as required by law, and that only a minority of those who do receive an order comply and actually install a device (DeYoung, 2002). Given this, the findings from the current study that much of California's interlock program is ineffective in reducing DUI recidivism are not surprising.

The effectiveness of IIDs can also be measured by examining their effects on crashes. Crashes could be considered an important, albeit unintended, effect of California's program. Interestingly, the results of this study showed that offenders who received an interlock order/restriction had a <u>lower</u> risk of crashes than offenders who did not receive an order, even though there was no difference between the groups on DUI recidivism. The explanation for these findings is not completely clear, although it seems likely that the reduction in crashes is due to a change in offenders' driving, similar to what happens when a license suspension order is issued. Studies have shown that suspended drivers drive less often and more carefully, to avoid detection by law enforcement (Hagen et al., 1980; Ross & Gonzales, 1988). The situation is similar with DWS-DUI/DUI offenders who have been ordered by the court to install an IID; most such offenders do not comply, and they may drive more carefully and less frequently, in order to avoid being apprehended for violating a court order.

The relationship between IIDs and crashes changes when crashes are examined for offenders who installed an interlock device. Surprisingly, the two analyses that examined this both showed that the risk of crashes was higher for offenders installing an interlock. Thus, even though installing an IID is associated with a reduction in DUI recidivism, it is also linked with an increase in crash risk, so that the overall traffic safety effect of IIDs are mixed, even when installed. With the exception of a study of Oregon's interlock program (Jones, 1992), which also found that IIDs were associated with an increase in crashes, prior research on IIDs has generally not examined the devices' effect on crashes, so the findings of this study are somewhat unique, and in need of replication. One possible explanation for the findings here is that drivers installing IIDs generally obtain restricted driver licenses, and so may drive more and thus have more exposure than drivers not installing a device, many of whom remain suspended.

This study also examined whether IIDs are more effective with DWS-DUI or DUI drivers. One analysis clearly demonstrated that IIDs are linked with reduced DUI recidivism for DWS-DUI offenders who installed an interlock device, and the study examining repeat DUI offenders receiving an IID order/restriction showed that such an order or restriction was linked with a reduced risk of DUI recidivism and crashes. One group for whom the devices seem to have little effect is first DUI offenders; first offenders ordered to install a device/receiving an interlock restriction had the same risk of subsequent crash and DUI conviction as first offenders not receiving an order/restriction. All first offenders in the current study had elevated BAC levels, with an average BAC of .20%, and could be considered high risk.

A final situation that was examined in the current study is the effectiveness of IIDs for second DUI offenders who choose to install a device in order to obtain a restricted driver license from the DMV. This study showed that such offenders had a significantly lower risk of DUI incidents, but a higher risk of crashes, compared to second offenders who remain suspended. This shows that a voluntary, administrative interlock program can work to reduce DUI recidivism, at least for second DUI offenders.

The results of this study are mixed and somewhat complex regarding the effectiveness of IIDs in California. IIDs are not the "silver bullet" that will solve the DUI problem, but they are effective in some situations with some offenders. Based on the results of this study, as well as the legislatively-mandated process study of IID in California, the following recommendations are made for modifying law and policy on ignition interlock in California.

Recommendations

1. The Judicial Council should investigate the development of an improved monitoring system for defendants ordered to install an IID.

The legislatively-mandated process evaluation showed that many offenders ordered to install an IID never do so, with little repercussion. This outcome evaluation indicates that IIDs can reduce DUI recidivism, when they are installed. Thus, the effectiveness of IIDs can be considerably enhanced by making sure that offenders ordered to install a device actually do so, and an effective monitoring system is essential. It is important that the courts play a central role in ordering IIDs, because the issuance of bench warrants for offenders who do not install a device likely has a significant effect in reducing driving and thus lowering the crash risk of DWS-DUI and DUI offenders.

2. Introduce legislation that would allow repeat DUI offenders who install an IID to reinstate their driver licenses early, after serving their APS suspension, or court-DMV suspension, whichever is shorter.
   The results of this study show that second DUI offenders who serve half of their suspension period, and install an IID in order to obtain a restricted driver license, have a lower risk of DUI recidivism than their counterparts who remain suspended. This supports the findings of a randomized study of multiple DUI offenders in Maryland, who installed IIDs in order to reinstate their driver licenses (Beck et al., 1999). While the results of both studies generalize only to those repeat DUI offenders who choose to install an IID, they do clearly show that interlocks can be effective for repeat DUI offenders.

   The effectiveness of IIDs could be enhanced by encouraging more repeat offenders to install an interlock in order to gain valid driving privileges. The legislatively-mandated process evaluation showed that only a small minority of eligible repeat offenders takes advantage of the current law, which allows them to obtain a restricted license if they install an IID (DeYoung, 2002).

   One way to encourage more repeat offenders to install interlocks is to shorten their period of suspension if they install a device. Currently, repeat DUI offenders receive a one-year APS suspension upon arrest, and upon conviction receive another suspension of two years or longer, depending upon their number of prior DUI convictions. By requiring repeat DUI offenders to serve only the shorter APS suspension if they install an IID, it is likely more repeat offenders will choose to install an interlock. It is important that a period of license suspension, such as the term required under APS, remain in effect, as numerous studies have shown that license suspension is one of the most effective countermeasures for DUI offenders.

3. Introduce legislation that would allow peace officers to impound the vehicles of drivers who are restricted to driving IID-equipped vehicles, and who are apprehended driving a vehicle without an interlock device.

One of the easiest ways to circumvent the IID sanction is simply to drive a vehicle that is not equipped with an interlock. Currently, there is no strong sanction in place that serves as a disincentive to drive a vehicle without an interlock, in violation of an interlock-restricted license. However, there is a logical and proven-effective countermeasure that would work to discourage circumventing an IID-restricted license in this way, and that is vehicle impoundment. A number of studies have demonstrated that vehicle impoundment works to reduce recidivism and lower crash rates for DUI and suspended drivers (Voas & DeYoung, 2002). It is likely that the threat of having their vehicle impounded would deter IID-restricted drivers from driving a vehicle without a device, thus adding teeth to the IID laws and enhancing traffic safety. It might also encourage offenders to install an interlock, knowing that circumventing their IID-restricted license by driving another vehicle could have a high cost.

4. Convene a task force comprised of representatives from the courts, DMV, law enforcement, district attorneys, public defenders and ignition interlock providers to investigate barriers to the use of IIDs.
   The results of both legislatively-mandated studies of ignition interlock in California—the process study and this outcome study—indicate that interlock devices can reduce DUI recidivism, but that developing and implementing a workable program utilizing the devices has proven elusive. The process study (DeYoung, 2002) identified several barriers to utilizing IIDs on a larger and more consistent basis, such as the cost of the devices, and these barriers need to be better identified and solutions to them developed in order for the devices to be used consistently, as provided for by statute. DMV should be charged with the responsibility of developing and leading the task force, and writing grants to fund it.

5. De-emphasize the use of IIDs for first DUI offenders.
   The results of this outcome study clearly show that IIDs are not effective in reducing DUI convictions or incidents for first DUI offenders, even those with high BACs at arrest. While their high blood alcohol levels suggest that they are an alcohol-dependent population, ignition interlock does not appear to be the answer to reducing their drinking and driving risk. This conclusion finds support in a study that interviewed drivers, and found that first offenders were more hostile to interlocks and regarded them as less useful, compared to repeat offenders (Baker, 1988). Because there is no evidence that interlocks are an effective traffic safety measure for first DUI offenders, the use of the devices should not be emphasized, even for those first offenders with high BACs at the time of arrest, as is currently done in California Vehicle Code (CVC) Section 23575 (a)(1).

6. Support the current law which requires judges to order DWS-DUI offenders to install an IID.
   CVC 23575 requires judges to order DWS-DUI convictees to install an IID on their vehicle. While the process study found that judges ordered IIDs for only a small minority of the DWS-DUI convictees that should have received an order, the results of this outcome study show that IIDs are associated with lower rates of recidivism for such offenders. Additionally, the degree of judicial compliance with mandatory IID sentencing is higher than under the previous IID law, showing a higher degree of judicial approval and acceptance of this new law. Thus, it is important that this law remains intact, and that methods be explored for increasing court orders for DWS-DUI offenders, as required by law. Strategies for increasing the use of IIDs would be developed as a part of recommendation 4 in this report.

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