



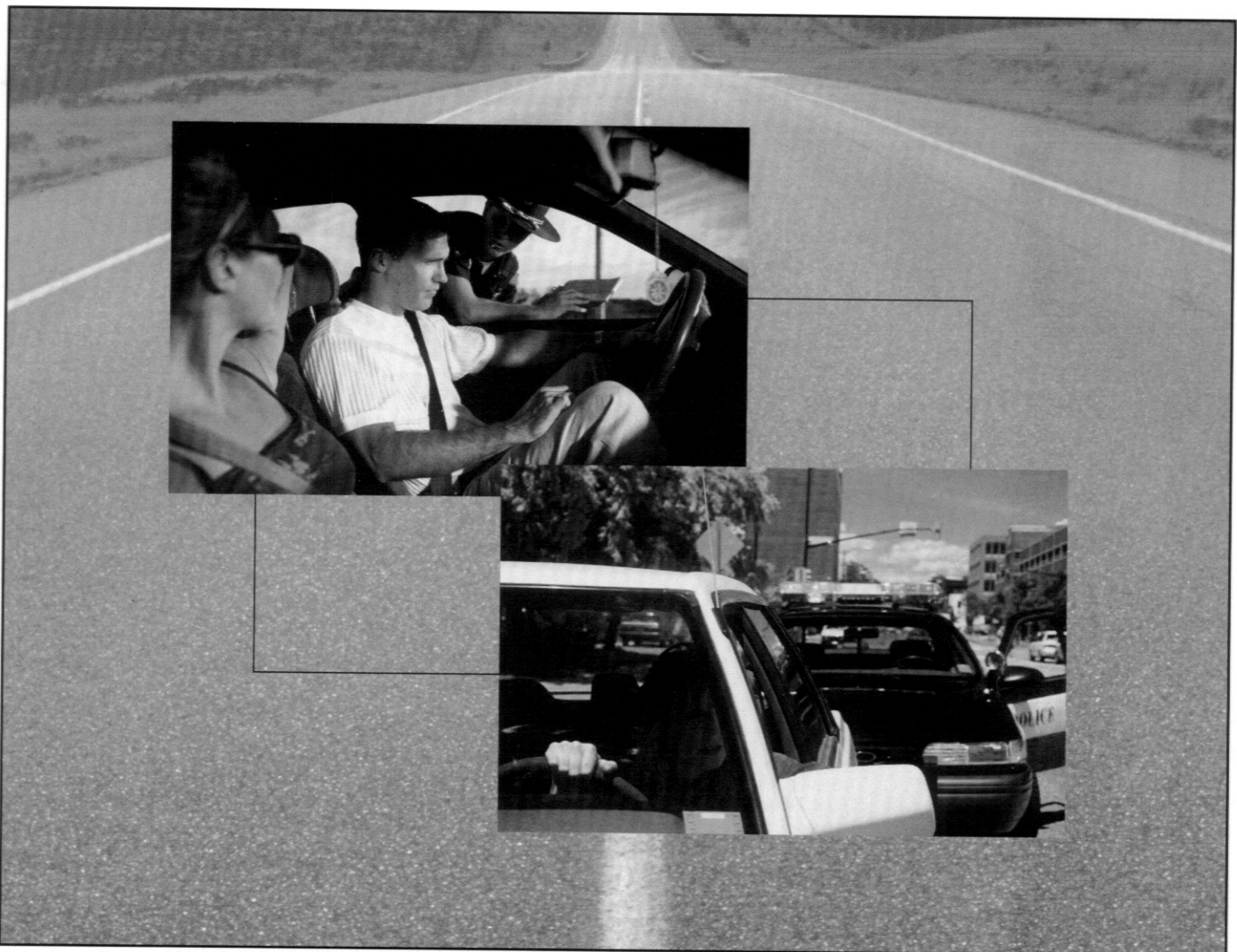
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PB2001-108577



Evaluation of Use and Lose Laws



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1. Report No. DOT HS 809 285		2. Government Accession No.		3. Recipient's Catalog No.	
4. Title and Subtitle Evaluation of Use and Lose Laws				5. Report Date June 2001	
				6. Performing Organization Code	
7. Author(s) R.G. Ulmer, V.I. Shabanova, and D.F. Preusser				8. Performing Organization Report No.	
9. Performing Organization Name and Address Preusser Research Group, Inc. 7100 Main Street Trumbull, CT 06611				10. Work Unit No. (TRAIS)	
				11. Contract or Grant No. DTNH22-97-D-05018, Task 98-03	
12. Sponsoring Agency Name and Address U.S. Department of Transportation National Highway Traffic Safety Administration 400 Seventh Street, S.W. Washington, D.C. 20590				13. Type of Report and Period Covered Final Report August 1998- November 2000	
				14. Sponsoring Agency Code	
15. Supplementary Notes Dr. Richard Compton served as the NHTSA Contracting Officer's Technical Representative for the study. We appreciate the guidance and support he provided.					
16. Abstract The term "Use and Lose" describes laws that authorize driver licensing actions against persons found to be using or in possession of illicit drugs, and against young persons found to be drinking, purchasing or in possession of alcoholic beverages. That is, "Use and Lose" has the meaning that if you use alcohol or other drugs you will lose your license. The objective of this study was to assess the highway safety effects of "Use and Lose" in Missouri and Pennsylvania in terms of subsequent motor vehicle crashes and violations of underage persons arrested for alcohol/drug violations. In Missouri, the results showed that in cases where the arrest involved possession or use of alcohol or drugs, license suspension was not applied as often as in cases with DWI-related arrests. In Pennsylvania, license suspension for non-DWI charges was more common. Drivers under the age of 21 suspended for drinking, purchasing or in possession of alcohol or illicit drugs were less likely to have subsequent traffic convictions and crash involvements than young drivers similarly charged but not suspended (adjusted odds ratio of 0.61 for convictions and 0.64 for crashes; adjusted hazard ratio of 0.75 and 0.66 for convictions and crashes respectively). License suspension is recommended for these "high risk" youthful drivers.					
17. Key Words Use and Lose laws License suspension Subsequent driver records Underage drinking			18. Distribution Statement Document is available through the National Technical Information Service Springfield, VA 22161 and at www.nhtsa.dot.gov		
19. Security Classif.(of this report) Unclassified		20. Security Classif.(of this page) Unclassified		21. No. of Pages 38	22. Price


PREFACE

We gratefully acknowledge the support received from the following organizations in providing the data and related information used in the study: the Missouri Division of Highway Safety, the Missouri State Highway Patrol, and the Division of Motor Vehicle and Driver Licensing of the Missouri Department of Revenue.

Also: the Pennsylvania Commission on Crime and Delinquency and the Safety Management Division, the Program Services Division and the Bureau of Driver Licensing of the Pennsylvania Department of Transportation.

In this report, DWI is used as a general abbreviation for impaired driving offenses. In Missouri, the formal offense is Driving While Intoxicated, while in Pennsylvania the charge is Operating Under the Influence of Alcohol.

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TECHNICAL SUMMARY

CONTRACTOR Preusser Research Group, Inc. 7100 Main Street Trumbull, CT 06611	CONTRACT NUMBER DTNH22-97-D-05018
REPORT TITLE Evaluation of Use and Lose Laws	REPORT DATE June 2001
REPORT AUTHOR(S) R.G. Ulmer, V.I. Shabanova, and D.F. Preusser	

The term "Use and Lose" has been coined to describe laws that authorize driver licensing actions against persons found to be using or in possession of illicit drugs, and against young persons found to be drinking, purchasing or in possession of alcoholic beverages. Therefore, "Use and Lose" has the meaning that if you use alcohol or other drugs you will lose your license.

Use and Lose laws generally have been enacted to combat alcohol/drug abuse irrespective of possible highway safety benefits. That is, as it came to be recognized that young persons were not very likely to be jailed or otherwise substantially sanctioned by the criminal justice system for alcohol/drug offenses, states sought a meaningful sanction to deter these offenses. Driver license removal, or denying licensure, was seen as a sanction that could be readily imposed and would be meaningful to youth.

While the focus of Use and Lose laws has been on deterring substance abuse, presumably they should also have highway safety effects. License denials, suspensions and revocations under these laws range from 30 days to as much as five years for repeat offenders. The persons convicted are likely to be a sample of individuals who are "at risk" for alcohol/drug impaired driving. Of special relevance from the highway safety point of view, are those Use and Lose laws which include alcohol violations since youth have very high crash rates and alcohol is the one drug most often associated with highway crashes.

Information from several states has indicated that the actual implementation of Use and Lose can vary from case to case. This circumstance creates the possibility of a naturally occurring "experiment" where the driving records of youth arrested on a Use and Lose charge who underwent a license action can be compared with the records of youth arrested who did not receive a license action.

Objective

The objective of the study was to assess the highway safety effects of Use and Lose in terms of subsequent motor vehicle crashes and violations of underage persons arrested for alcohol/drug violations. The study was *not* intended to assess why jurisdictions do or do not impose Use and Lose sanctions.

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Rather, it makes use of such differences to establish treatment and comparison groups that are compared regarding subsequent driving records.

Method

Data obtained from two states that have longstanding Use and Lose laws, Missouri and Pennsylvania, were used in the study. The Missouri law, titled "Abuse and Lose", calls for the suspension of driving privileges of persons under the age of 21 who plea or are found guilty of: 1) Any alcohol related traffic offense; or 2) Possession or use of alcohol, committed while operating a motor vehicle; or 3) Possession or use of a controlled substance; or 4) Alteration, modification or misrepresentation of a license to operate a motor vehicle; or 5) A second offense of possession or use of alcohol by persons under the age of 18. The suspension period or delay in licensing is 90 days for a first offense and one year for subsequent offenses. Conviction records used in the study came from the Missouri State Highway Patrol's Traffic Arrest System/Alcohol and Drug Offense Records System. These data covered persons under the age of 21 who were arrested in the years 1995, 1996 and 1997 who pled or were found guilty of one of the charges just noted. Arrests and convictions for alcohol related traffic offenses were statewide data while arrests and convictions for the other charges were those made by the Highway Patrol. Driver record data came from the Division of Motor Vehicles and Driver Licensing of the Missouri Department of Revenue. Missouri is one of a few states that does not include motor vehicle crash involvements in its driver record files. The resulting data, therefore, included records of traffic law convictions and actions taken against the drivers' licenses. Driver records for 4,267 cases were available for analysis.

The Pennsylvania Use and Lose law calls for license suspension or delay in licensing of persons under the age of 21 convicted of: 1) Purchase, consumption, possession or transportation of liquor, malt or brewed beverages; or 2) Misrepresenting age to obtain alcohol; 3) or Carrying a false identification card. The suspension period or delay in licensing is 90 days for a first offense, one year for a second offense and two years for subsequent offenses. The Pennsylvania Commission on Crime and Delinquency provided data on Use and Lose cases filed in the District Courts during 1995, 1996 and 1997. This file was transmitted to the Bureau of Driver Licensing of the Pennsylvania Department of Transportation which did a name/date of birth search of its driver record files to obtain data on the crashes and motor vehicle law violations of the persons involved. Driver records for 5,690 cases were available for analysis.

Results

In Missouri, DWI offenses by persons under age 21 are among the charges included in the state's Abuse and Lose law. The data obtained from Missouri showed that a driver's license action took place in the large majority of these cases (85%), while a licensing action was rarely reported with charges of possession or use of alcohol (16%) or possession or use of a controlled substance (14%). Unfortunately, this resulted in small numbers of either suspended or not suspended cases for comparison in the three groups. In the most extreme instance, there were only 37 persons charged with possession or use of controlled substances who had undergone a licensing action. The analysis of subsequent traffic violations

between all of those who received a suspension versus all of those not suspended showed fewer subsequent violations in the suspension group. However, these differences were not statistically significant when calculated within the three groups separately.

The Pennsylvania data set proved to be more robust. Almost all of the Use and Lose charges were for purchase, consumption, possession or transportation of alcohol. Unlike Missouri, DWI is not a Use and Lose law charge in Pennsylvania. However, it was found that about one-half of the Use and Lose charges were made in the context of a DWI arrest. That is, the driving records showed a DWI arrest and license action on the same date as the arrest on the Use and Lose charge, strongly suggesting that the arresting officer made multiple charges in the same event. The other one-half of the cases were not DWI associated. About one-third of all of the cases did not undergo license action.

The results in Pennsylvania showed that those who underwent a license action were *less* like to receive a subsequent traffic violation conviction. The DWI associated suspended drivers were *least* likely to have a subsequent conviction (adjusted Odds Ratio [OR] equals 0.52); followed by the Use and Lose suspended drivers (OR=0.61); as compared to those drivers whose licenses were not suspended. Subsequent convictions were more common among males (OR=1.90); less common among older, i.e., nineteen and twenty year-old, drivers (OR=0.78). The Use and Lose suspended drivers were least likely to have a subsequent crash involvement (OR=0.64) followed by the DWI associated suspended drivers (OR=0.79); as compared to those drivers whose licenses were not suspended.

Conclusion

The young persons examined in the present study had been arrested on charges of alcohol and substance abuse, often including DWI. In both Missouri and Pennsylvania, the majority of these persons had traffic violation convictions prior to the input arrest and a large minority had a previous action taken against their driver's license. Also in Pennsylvania, about one in four had a previous motor vehicle crash. These circumstances suggest that the study population was high risk from the highway safety point of view.

The findings in Pennsylvania, that license actions taken against this group do lead to fewer subsequent violations and crashes, provides additional evidence that the withdrawal of driving privileges is an effective driver control measure. While the study findings do not comment on the possible deterrent effects of Use and Lose laws on substance abuse by young persons, the application of license actions do lead to fewer violations and crashes by this high risk group.

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I. INTRODUCTION

The term “Use and Lose” has been coined to describe laws that authorize driver licensing actions against persons found to be using or in possession of illicit drugs, and against young persons found to be drinking, purchasing or in possession of alcoholic beverages. Use and Lose laws generally have been enacted to combat alcohol/drug abuse irrespective of possible highway safety benefits. That is, as it came to be recognized that young persons were not very likely to be jailed or otherwise substantially sanctioned by the criminal justice system for alcohol/drug offenses, states sought a meaningful sanction to deter these offenses. Driver license removal, or denying licensure, was seen as a sanction that could be readily imposed and would be meaningful to youth.

While the focus of Use and Lose laws has been on deterring substance abuse, presumably they should also have highway safety effects. License denials, suspensions and revocations under these laws range from 30 days to as much as five years for repeat offenders. The persons convicted are likely to be a sample of individuals who are “at risk” for alcohol/drug impaired driving. Of special relevance from the highway safety point of view, are those Use and Lose laws which include alcohol violations since youth have very high crash rates and alcohol is the one drug most often associated with highway crashes.

Reports from several states have indicated that the actual implementation of Use and Lose can vary from case to case. In some jurisdictions, cases may be diverted prior to prosecution. In others, the documentation regarding a conviction may never be forwarded to the state licensing authority to trigger the licensing action. Other jurisdictions do routinely convict and then process the necessary paperwork. The less than full implementation of Use and Lose creates the possibility of a naturally occurring “experiment” where the driving records of youth arrested on a Use and Lose charge who underwent a license action can be compared with the records of youth arrested in the same state but not sanctioned.

The objective of the study was to assess the highway safety effects of Use and Lose in terms of subsequent motor vehicle crashes and violations of underage persons arrested for alcohol/drug violations. The study was *not* intended to assess why jurisdictions do or do not impose Use and Lose sanctions. Rather, it makes use of such differences to establish treatment and comparison groups that are compared regarding subsequent driving records.

Background

Licenses to operate motor vehicles were first required in 1903 by the states of Massachusetts and Missouri. It wasn't until the 1950s, however, before all states had implemented an examination/road test as a condition of licensing (FHWA, 1997).

Among other features, the driver licensing process provides a basis for driver control measures. For example, most states have point-count systems wherein actions can be taken after motorists have accumulated a number of points that are assessed for traffic violations and possibly for at-fault crashes. These systems range from simple point-count thresholds that trigger mandatory license suspension to more complex sequential driver improvement programs that commence before the license suspension threshold is reached (Peck, 1976).

Convictions for individual motor vehicle offenses can also lead to license revocation or suspension. The relevant offenses usually are those considered very serious in nature (e.g., vehicular homicide, DWI, leaving the scene of a crash, drag racing, etc.). License actions also take place when certain legal requirements are not met (e.g., failure to submit to a chemical test for alcohol, failure to carry motor vehicle insurance, falsifying a driver's license application, etc.).

There are also instances in particular states where license withdrawal is required as a penalty for offenses that lie outside the usual motor vehicle law/driver control arena. Some examples include: using a motor vehicle in the commission of a felony, motor vehicle theft, discharging a firearm from a motor vehicle, committing an immoral act in which a motor vehicle was used, advocating the overthrow of the government, defacing public or private property, non-payment of child support, and withdrawal from high school.

In the U.S., age 16 is when substantial numbers of persons begin to obtain unrestricted driver's licenses. In 1998, 44 percent of 16 year-olds were licensed. The percentages licensed among 17, 18, 19 and 20 year-olds were 60%, 75%, 79% and 82% respectively. The teen years are a time of transition to adulthood and obtaining a driver's license is considered by many teens to be an important step toward growing independence. The teen years are also when drinking, drinking-driving, and experimentation with drugs begin to appear (Preusser et al., 1975; Johnston et al., 2000).

Use and Lose laws generally began to appear during the mid-1980s. The basic premise of these laws was that teens highly value obtaining a driver's license and that the threat of losing their license, or delaying when one could be obtained, would deter many from substance abuse. Information compiled by NHTSA indicates that presently there are 36 states and the District of Columbia that specifically authorized driver license denial or withdrawal for underage alcohol purchase, consumption or possession (see Appendix A).

As noted, information from such states as Missouri, Oregon, Pennsylvania, and Wisconsin suggest that the sanctions under Use and Lose laws are not uniformly applied. The problem appears to be that some judges feel that the penalty, license withdrawal, is too severe for alcohol possession violations. Others feel that the sanction is unrelated to the offense and

thus should not be applied. Still others, particularly in the juvenile system at the municipal level, believe that imposing license actions is not a part of their job (Preusser et al., 1992).

In 1994, Congress moved to expand the Use and Lose approach to drug offenses by persons of all ages. Effective that year, Congress required that states either adopt legislation mandating a 6-month license suspension or revocation of persons convicted of drug offenses, or certify that the Governor and legislature are opposed to such a law. States that failed to act would have highway funds withheld (23 USC Section 159). In the year 2000, eighteen states and the District of Columbia had enacted such legislation while 32 states certified opposition to such a law (see Appendix A).

From the highway safety perspective, the essential feature of Use and Lose laws is the potential for license withdrawal. Court ordered license suspensions or revocations have been problematic irrespective of Use and Lose. For instance, one of the early system problems identified with DWI control was the frequent failure of the courts to order license withdrawal following conviction. This problem ultimately led to Administrative License Revocation (ALR) laws which require state licensing agencies, rather than the courts, to suspend or revoke the licenses of drivers arrested for DWI who have blood alcohol concentrations at or above the illegal level (for example, .08) or who refuse to submit to a chemical test for alcohol.

While there is evidence that ALR does not have a major impact on offenders' jobs or incomes (Knoebel and Ross, 1997), the mandatory nature of ALR license actions has been reduced in many states by allowing hardship licenses that permit drivers otherwise suspended or revoked to drive at particular times and/or for particular purposes. In some states, hardship licenses are available almost immediately after the ALR action, while in others, a minimum "hard suspension" period is required. In any event, several studies have shown that mandatory license withdrawal/ALR laws are effective general and specific deterrents to DWI behavior (Lacey et al., 1991; Preusser et al, 1988). Evidence suggests that allowing immediate hardship licensing is less effective than requiring a hard suspension period (Nichols and Ross, 1989).

License withdrawal has also been shown to be more effective than treatment or rehabilitation alternatives in DWI cases (Preusser et al., 1976; Sadler et al., 1991) and to have traffic safety benefits not shown by other DWI sanctions at the time (Mann et al., 1991). License withdrawal has also been found to be more effective than driver improvement educational programs with repeat traffic offenders (McKnight, A.J. and Tippetts, A.S., 1997). There is no known prior literature on the effects of Use and Lose Laws.

II. METHOD

Site Selection

Study states were sought that had Use and Lose laws applicable to alcohol offenses covering persons under the age of 21. The NHTSA regional offices were first canvassed regarding states with such laws that might be willing and able to participate. This, in turn, led to contacts within various states about the study. The main issue was whether a state could provide an adequate sample of persons arrested on a Use and Lose charge and linkage to driver record files. The two states that emerged from this process were Pennsylvania and Missouri.

Missouri

The Law

The Missouri law, titled "Abuse and Lose", is found in Chapter 577.500 of the state's statutes (see Appendix B). The law calls for the suspension of driving privileges of persons under the age of 21 who plea or are found guilty of:

- 1) Any alcohol related traffic offense; or
- 2) Possession or use of alcohol, committed while operating a motor vehicle; or
- 3) Possession or use of a controlled substance; or
- 4) Alteration, modification or misrepresentation of a license to operate a motor vehicle; or
- 5) A second offense of possession or use of alcohol by persons under the age of 18.

The suspension period for a first offense is 90 days and one year for subsequent offenses.

Data

Conviction records used in the study came from the Missouri State Highway Patrol's Traffic Arrest System/Alcohol and Drug Offense Records System. These data covered persons under the age of 21 who were arrested in the years 1995, 1996, and 1997 who pled or were found guilty of one of the charges just noted. Arrests and convictions for alcohol related traffic offenses were statewide data while arrests and convictions for the other charges were only those made by the Highway Patrol. The initial file contained 4,843 convictions.

Driver record data were then sought from the Division of Motor Vehicles and Driver Licensing of the Missouri Department of Revenue. Missouri is one of a few states that does not include motor vehicle crash involvements in its driver record files. The resulting data, therefore, only included records of traffic law convictions and actions taken against the drivers' licenses, not crashes. The data request was processed in August 1999.

Among the 4,843 data requests, there were 606 instances where no driver's license number was available. Of these, 417 were matched using name and date of birth and 189 could not be matched and were thus unusable. In addition, there were 387 instances of multiple convictions for the same individual. In these cases, the record with the earliest arrest date was used. The final analysis, therefore, was based on 4,267 cases where a person was convicted of a charge that could expose them to a Use and Lose license action for whom driver history data were available. That is:

$$4,843 \text{ (original)} - 189 \text{ (not matched)} - 387 \text{ (multiple convictions)} = 4,267 \text{ (for analysis).}$$

Pennsylvania

The Law

The Pennsylvania Use and Lose law targeted toward youth is found in Sections 6307-6313 of the state's Crimes Code (see Appendix B). The law calls for license suspension or delay in licensing of persons under the age of 21 convicted of:

- 1) Purchase, consumption, possession or transportation of liquor, malt or brewed beverages; or
- 2) Misrepresenting age to obtain alcohol; or
- 3) Carrying a false identification card.

The suspension period or delay in licensing is 90 days for a first offense, one year for a second offense and two years for subsequent offenses.

Data

The Pennsylvania Commission on Crime and Delinquency (PCCD) provided data on all cases filed in the state's District Courts during 1995, 1996, and 1997 involving one of the charges just noted. This initial file contained 6,822 cases. The city of Philadelphia has a municipal court system and the city of Pittsburgh has a magistrate court system. Cases from these courts were not available for the study.

The PCCD file was transmitted to the Bureau of Driver Licensing of the Pennsylvania Department of Transportation which did a name/date of birth search of its driver record files to obtain data on the crashes and motor vehicle law violations of the persons involved. In 1,132 cases, no match was obtained. Driver records for 5,690 cases, therefore, were available for analysis.

Analytic Approach

The data from the two states were analyzed separately. The general approach was to group the cases based on the specific Use and Lose charges and, within these, whether or not licensing actions had taken place. Subsequent driving events (violations in Missouri, crashes and violations in Pennsylvania) were then tallied for the resulting subgroups. With the Missouri data, the chi-square statistic was used to test the subsequent violation records of those who did and did not undergo license actions.

With the Pennsylvania data, the subsequent driving performance of those who did and did not undergo license actions were first compared using logistic regression and odds-ratios. Significance of parameter estimates was tested with -2 log likelihood statistic and of the odds ratio with chi-square statistic (p-value <.05). Survival analysis was then employed to estimate the likelihood of subsequent first violation or first crash over time between different groups of license actions. In the survival analysis models, subjects were tracked until their first post input arrest traffic event or until the last date available in the driver history files, but limited to 48 months. Survival was computed by the Kaplan-Meier method. Differences in the survival parameters were tested for significance using the log-rank test. The statistical significance of each parameter was first tested in univariate Cox regression analysis, then significant predictors were entered into Cox proportional hazards multiple regression models. The survival analysis was conducted with the SPSS 10.0 software. A possible interaction between age and gender was tested and found to be not significant. Appendix C provides a summary of this result.

III. RESULTS

Missouri

Sample Characteristics

Missouri records contained information on 4,267 individuals who were arrested between January 1, 1995, and December 31, 1997, on Use and Lose charges for whom a driver history record could be found. Table 1 shows characteristics of the Missouri study group. Persons under 17 made up less than four percent of the subjects and there were substantially fewer 17 year-olds than 18, 19 or 20 year-olds. Eighty-six percent were males and 14 percent were females. Just over one-half had a previous traffic violation and about one in three had previous official driver license actions (e.g., points assessed, suspensions, etc.). Charges involving license alteration and second offense possession of alcohol by persons under age 18 were too few (24) for meaningful analysis and were excluded.

Analysis

In Missouri, alcohol-related traffic offenses are included in the State's Abuse and Lose law. As noted, statewide data were obtained for this class of offense while only Missouri State Highway Patrol arrests were obtained for the other Abuse and Lose charges. The result, shown in Table 2, was that the large majority (72.3%) of the input arrests were for DWI related charges.

The frequency with which driver license actions were taken against the three types of arrested offenders also varied substantially. Table 3 shows that approximately 85 percent of the DWI arrested group underwent licensing action. The reverse was true for non-DWI Abuse and Lose violations. Table 3 indicates that only 16 percent of the Possession of Alcohol arrests resulted in a license action. Similarly, only 14 percent of the Possession or Use of Controlled Substance arrests resulted in a license action. For the two violations combined, there were only 182 cases for which a non-DWI Abuse and Lose violation resulted in a license action versus 999 for which no license action was identified.

Across the three violation types listed in Table 3, there were 2,802 cases that resulted in a license action and 1,465 that did not result in a license action. The vast majority of the license actions were related to DWI events (94 percent) whereas the majority of the no license actions were related to possession or use of alcohol or controlled substances (68 percent).

Table 4 shows the number of subsequent traffic violations for the suspension, or license action group, versus the no license action group. The results indicate that the no-suspension group was somewhat more likely to have a subsequent violation on their record than the suspension group. However, this comparison should be viewed with some caution since the

suspension versus no-suspension groups arise from different input events, i.e., different arrest charges. Moreover, subsequent violations tabulated separately for the DWI and two non-DWI groups did not show statistically significant differences between those with license action versus those with no license action.

Table 1. Study Population Characteristics, Missouri (N=4,267)

Characteristic	N (%)
Age:	
Under 17	159 (3.7)
17	633 (14.8)
18	1,032 (24.2)
19	1,201 (28.1)
20	1,242 (29.1)
Gender:	
Male	3,669 (86.0)
Female	598 (14.0)
Previous Traffic Violations:	
No	2,019 (47.3)
Yes	2,248 (52.7)
Previous Driver License Actions:	
No	2,864 (67.1)
Yes	1,403 (32.9)

Table 2. Missouri Input Arrests (N=4,267)

Charge	N (%)
DWI	3,086 (72.3)
Possession or Use of Alcohol	915 (21.4)
Possession or Use of Controlled Substance	266 (6.2)

In summary, the main conclusion from the Missouri data was that: license action was common for young persons arrested on a DWI charge; license action was not common for young

persons arrested on other Abuse and Lose charges. Additional analysis of the Missouri data was not done given the small number of non-DWI license suspensions identified.

Table 3. License Action by Input Arrest Type

Charge	License Action, N (%)
DWI	Yes: 2,620 (84.9) No: 466 (15.1)
Possession or Use of Alcohol	Yes: 145 (15.8) No: 770 (84.2)
Possession or Use of Controlled Substance	Yes: 37 (13.9) No: 229 (86.1)

Table 4. Subsequent Violations-Suspension versus No Suspension

Subsequent Violation	Underwent Suspension N (%)	No Suspension N (%)
Yes	1,447 (51.6)	807 (55.1)
No	1,355 (48.4)	658 (44.9)

$\chi^2 = 4.58, p < .05$

Pennsylvania

Sample Characteristics.

Pennsylvania records contained information on 5,690 individuals who were arrested between December 31, 1994, and December 31, 1997, on Use and Lose charges for whom a driver history record could be found. Table 5 describes demographic characteristics and driving history of the study population. Almost all of the persons involved were age 18 or older and were about equally divided among the individual years of age (18, 19 or 20). In Pennsylvania, persons under the age of 18 are usually processed in the juvenile court system. These cases were not available to the study.

The mean age of the subjects was 19.5 years (SE=0.86 years). Almost 90 percent were males and about 10 percent were females. Over two thirds had at least one previous traffic

violation (prior to the Use and Lose arrest date), about one in four had a previous motor vehicle crash, and about 40 percent had at least one previous driver's license suspension.

Table 5. Study Population Characteristics, Pennsylvania (N=5,690)

Characteristic	N (%)
Age:	
Under 18	45 (0.8)
18	1,766 (31.0)
19	1,972 (34.7)
20	1,907 (33.5)
Gender:	
Male	4,849 (89.2)
Female	585 (10.8)
Previous Traffic Violations:	
No	1,808 (31.8)
Yes	3,882 (69.2)
Previous Crashes:	
No	4,277 (75.2)
Yes	1,413 (24.8)
Previous License Suspensions:	
No	3,424 (60.2)
Yes	2,266 (39.8)

Almost all (5,607) of the arrest charges were for purchase, consumption, possession or transportation of alcohol (Section 6308). The remaining charges were for misrepresenting age to purchase alcohol or carrying false identification (83).

The driver record file was merged with the PCCD court data. This process revealed that one-half (2,851) of all of the Use and Lose charges had been made coincidental with a DWI arrest that had led to a DWI licensing action. Among these DWI-related cases, approximately one-half also underwent a Use and Lose license suspension. (Such suspensions are applied sequentially.) For the purposes of the analysis, this group of drivers was considered as having a DWI-related license suspension.

Among the remaining cases, 1,821 had no license action associated with the input arrest, 784 had undergone only a Use and Lose Suspension, and 234 had undergone a license action for

another reason such as point count. Table 6 presents the summary statistics for these four groups of driver's license actions.

Subsequent driving behaviors of these individuals are summarized in Table 7. About 60 percent of the study population committed at least one subsequent traffic violation and about one fifth were involved in at least one subsequent motor vehicle crash.

Table 6. Four Driver's License Action Groups Following Input Arrest, Pennsylvania (N=5,690)

Suspension	N (%)
DWI-related	2,851 (50.1)
Only Use/Lose-related	784 (13.8)
Other	234 (4.1)
None	1,821 (32.0)

Table 7. Distribution of Subsequent Violations, Crashes, and License Actions, Pennsylvania (N=5,690)

Subsequent Event	N (%)
Violations:	
No	2,226 (39.1)
Yes	3,464 (60.9)
Crashes:	
No	4,669 (82.1)
Yes	1,021 (17.9)
Use/Lose Suspension:	
No	5,038 (88.5)
Yes	652 (11.5)
DWI Suspension:	
No	5,576 (98.0)
Yes	114 (2.0)

Bivariate and Multivariate Analyses for the Probability of A Subsequent Traffic Violation.

Age, gender, and driver's license action group after the input arrest were each evaluated separately and together in association with the odds of having a subsequent violation. Bivariate analyses involving each of the three population characteristics showed significant unadjusted

associations with the odds of committing a subsequent traffic violation. Being younger or male or not having any license action for the input arrest were significantly associated with the higher odds of committing a subsequent violation. Compared to females, males were more likely (odds ratio [OR] =2.0, 95% CI, 1.68-2.37), and for every increase of age increment, older subjects were 0.76 times as likely as younger subjects to have a subsequent violation (95% CI, 0.72-0.81). For example, for an age of 18.8 (25th percentile) vs. 20.3 (75th percentile), the OR=1.51 (95% CI, 1.37-1.64). Compared to the group that had no driver's license actions, those who had a DWI-related action were the least likely (OR=0.50, 95% CI, 0.44-0.56), and those who had a Use/Lose-related or other license action were also less likely to have a subsequent traffic violation (OR=0.60, 95% CI, 0.52-0.73; OR=0.68, 95% CI, 0.52-0.91).

The adjusted associations between age, gender, driver's license action group, and the incidence of a subsequent traffic violation confirmed the results obtained from the bivariate analyses. For every increment of age increase, older subjects were 0.78 times as likely as younger subjects (95% CI, 0.73-0.83). For example, for subjects 18.8 years old (25th percentile) vs. 20.3 years old (75th percentile), OR=1.45 (95% CI, 1.32-1.60); males were more likely than females (OR=1.90, 95% CI, 1.60-2.27); the group with a DWI-related action was the least likely (OR=0.52, 95% CI, 0.46-0.60), and the groups with a Use/Lose-related or other license action were less likely than the one that did not have any driver's license action for the input arrest to commit a subsequent traffic violation (OR=0.61, 95% CI, 0.51-0.73; OR=0.65, 95% CI, 0.49-0.88). Table 8 summarizes crude and adjusted associations between each of the independent variables and the outcome variable.

Table 8. Associations Between Age or Gender or Driver's License Action Group with a Subsequent Violation, Pennsylvania (N=5,690)

Characteristic	Proportion with Event (%)	Crude OR (95% CI)	Chi-square (p-value)	Adjusted OR (95%CI)	p-value
Age		0.76 (0.72, 0.81)	72.97 (0.000)	0.78 (0.73, 0.83)	0.000
Gender					
Male	3044/4849(62.8)	2.00 (1.68, 2.37)	61.51 (0.000)	1.90 (1.60, 2.27)	0.000
Female	268/585 (45.8)				
License Action Group					
None	1290/1821(70.8)				
Use/Lose Related	469/784 (59.8)	0.61 (0.52, 0.73)		0.61 (0.51, 0.73)	0.000
DWI Related	1559/2851(54.7)	0.50 (0.44, 0.56)		0.52 (0.46, 0.60)	0.000
Other	146/234 (62.4)	0.68 (0.52, 0.91)	122.42 (0.000)	0.65 (0.49, 0.88)	0.004

◇2*[LL(N)-LL(0)]=229.090, p=0.000 (Model included age, gender, and license action group)

Bivariate and Multivariate Analyses for the Probability of A Subsequent Crash

Unadjusted odds ratios of having a subsequent crash showed that having a license action for the input arrest was negatively associated with the probability of having a subsequent crash. Those individuals who had a driver's license action suspension were less likely than those who did not to be involved in a subsequent motor vehicle crash: for a Use/Lose-related driver's license suspension OR=0.63 (95% CI, 0.50-0.79), for those who had a DWI-related suspension OR=0.76 (95% CI, 0.66-0.88), and for those who had another license action OR=0.70 (95% CI, 0.48-1.01). However, the difference based on age or gender was not found to be statistically significant ($p>0.050$).

Multivariate analyses further confirmed that only the type of a driver's license action received for the input arrest statistically affected the odds of being involved in a subsequent 1st crash. Compared to the offenders who did not have any license actions, those who had a Use/Lose-related action were the least likely and those with a DWI-related license action were less likely to be involved in a subsequent crash (OR=0.64, 95% CI, 0.50-0.80; OR=0.79, 95% CI, 0.68-0.92). This difference between those who had other license actions and those who did not have any was marginally significant (OR=0.69, 95% CI, 0.47-1.01). Also, the difference in the incidence of a subsequent crash was not statistically significant based on age and gender ($p>0.050$). Since the parameter estimates of the significant predictor, "license action group", changed by less than 30 percent when age and gender were taken out of the model, the latter were not confounders and were not retained in the model. Table 9 presents summary statistics for the predictors of having a subsequent crash.

Table 9. Associations Between Age or Gender or Driver's License Action Group with a Subsequent Crash, Pennsylvania (N=5,690)

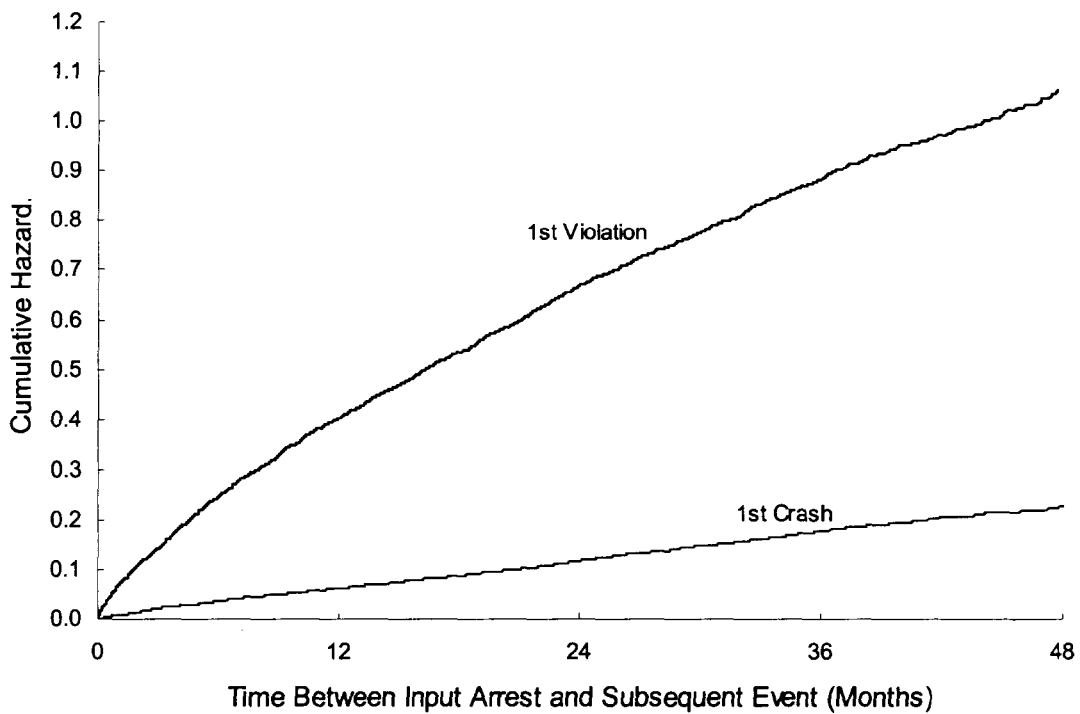
Characteristic	Proportion with Event (%)	Crude OR (95% CI)	Chi-square (p-value)	Adjusted OR (95%CI)	p-value
Age		0.93 (0.86, 1.01)	2.99 (0.08)	0.94 (0.87, 1.02)	0.116
Gender					
Male	885/4849(18.3)	1.18 (0.94, 1.49)	1.960 (0.16)	1.16 (0.92, 1.46)	0.220
Female	93/585 (15.9)				
License Action Group					
None	386/1821 (21.2)				
Use/Lose Related	113/784 (14.4)	0.63 (0.50, 0.79)		0.64 (0.50, 0.80)	0.000
DWI Related	485/2851 (17.0)	0.76 (0.66, 0.88)		0.79 (0.68, 0.92)	0.003
Other	37/234 (15.8)	0.70 (0.48, 1.01)	22.13 (0.00)	0.69 (0.47, 1.01)	0.057

◆ $2*[LL(N)-LL(0)]=23.431$, $p=0.000$ (For the model with "license action group" variable only)

Proportional Hazard Analyses: Rate of Incidence of 1st Subsequent Violation or 1st Subsequent Crash.

On average, the subjects were followed for 3.4 years (25th percentile=2.7 years, 95th percentile=4.8 years). Overall, the cumulative rate of a subsequent 1st violation per month after the input arrest was higher than the one for a subsequent 1st crash. Figure 1 shows that the slope for the rate of a subsequent 1st violation is greater than the slope for the subsequent 1st crash.

Figure 1. Cumulative Hazard Rate for Subsequent 1st Violation vs. Subsequent 1st Crash, Pennsylvania (N=5,690)



Proportional Hazard Analyses: Associations Between Age or Gender or Driver's License Action Group with the Rate of Incidence of 1st Subsequent Violation.

Using Cox proportional hazards regression model, age, gender, and license action group were found to be significant predictors of the rate of incidence of a subsequent 1st traffic violation. The unadjusted hazard ratio (HR) of 0.84 for age showed that, for every increase in age increment, older offenders were committing 1st subsequent traffic violations at 0.84 times the rate of the younger offenders (95% CI, 0.81-0.87). For example, subjects 18.8 years old (25th

percentile) had 1.30 times the rate of 20.3 year-olds (75th percentile) offenders (95% CI, 1.23-1.37).

Further, compared to females, males had a higher incidence of having a 1st subsequent traffic violation over time (HR=1.60, 95% CI, 1.41-1.81). Offenders who received a DWI-related driver's license action committed 1st subsequent traffic violations at 0.65 (95% CI, 0.60-0.70), those who received a Use/Lose-related driver's license suspension at 0.75 (95% CI, 0.67-0.83), and those with other license action at 0.82 (95% CI, 0.69-0.97) times the rate of those who had no license actions.

Adjusted associations between age, gender, driver's license action group, and the rate of incidence of subsequent 1st traffic violations confirmed the results of the unadjusted associations discussed above. Older offenders had a lower rate of incidence of a subsequent 1st traffic violation than the younger offenders: HR=1.25 (95% CI, 1.19-1.32) for 18.8 year-olds (25th percentile) vs. 20.3 year-olds (75th percentile). Males committed subsequent 1st traffic violations at 1.52 times the rate of females (95% CI, 1.35-1.73). Finally, compared to the group with no license actions after the input arrest, those with a DWI-related license action had the smallest rate of incidence of a subsequent 1st traffic violation (HR=0.68, 95% CI, 0.63-0.74), those with a Use/Lose-related license action had the second smallest rate (HR=0.75, 95% CI, 0.68-0.84), and those with other license actions had the third smallest rate (HR=0.81, 95% CI, 0.68-0.96). Table 10 presents the results of crude and adjusted associations between the independent and dependent variables.

Table 10. Proportional Hazards Model: Age or Gender or Driver's License Action Group as Predictors of Rate of Incidence of 1st Subsequent Violation, Pennsylvania (N=5,690)

Characteristic	Crude HR, 95% CI	p-value	Adjusted HR, 95% CI	p-value
Age	0.84 (0.81, 0.87)	0.000	0.86 (0.83, 0.89)	0.000
Gender:				
Male	1.60 (1.41, 1.81)	0.000	1.52 (1.35, 1.73)	0.000
Female				
License Action Group:				
None				
Use/Lose-related	0.75 (0.67, 0.83)	0.000	0.75 (0.68, 0.84)	0.000
DWI-related	0.65 (0.60, 0.70)	0.000	0.68 (0.63, 0.74)	0.000
Other	0.82 (0.69, 0.97)	0.022	0.81 (0.68, 0.96)	0.015

◇-2Log likelihood=53540.75, p=0.000 (Model includes age, gender, and license action group)

Figure 2 presents the plots of rates of incidence of having a subsequent 1st traffic violation after the input arrest for males vs. females. Differences in the cumulative rates of having a subsequent 1st traffic violation between the four license action groups are depicted in Figure 3.

Figure 2. Cumulative Hazard Rate for Subsequent 1st Violation: Males vs. Females, Pennsylvania (N=5,690)

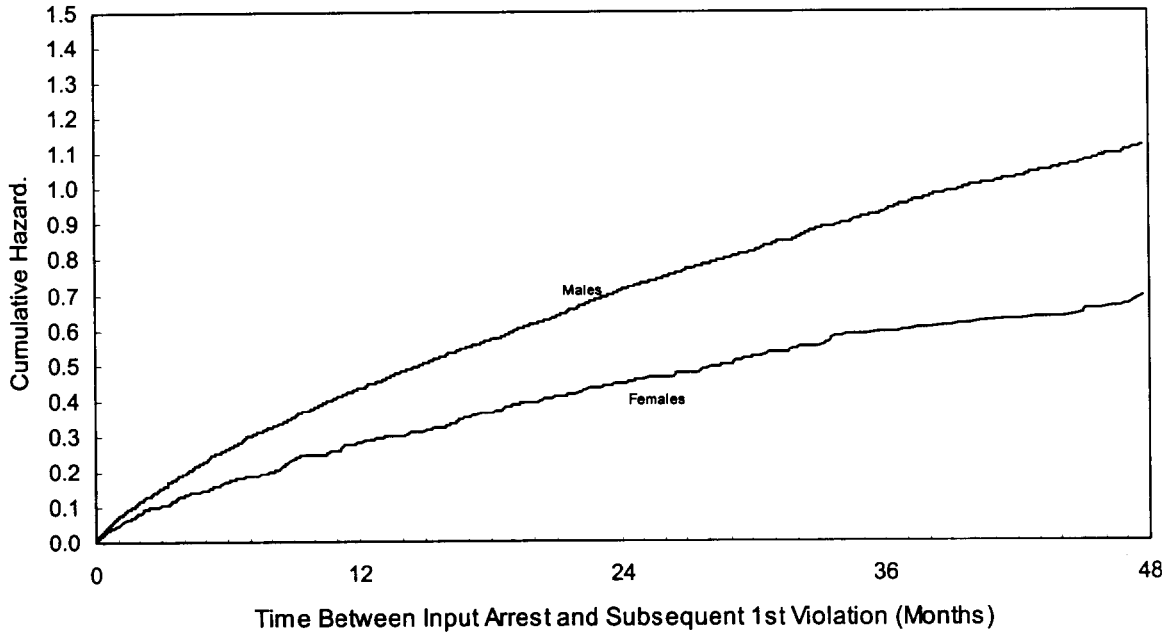
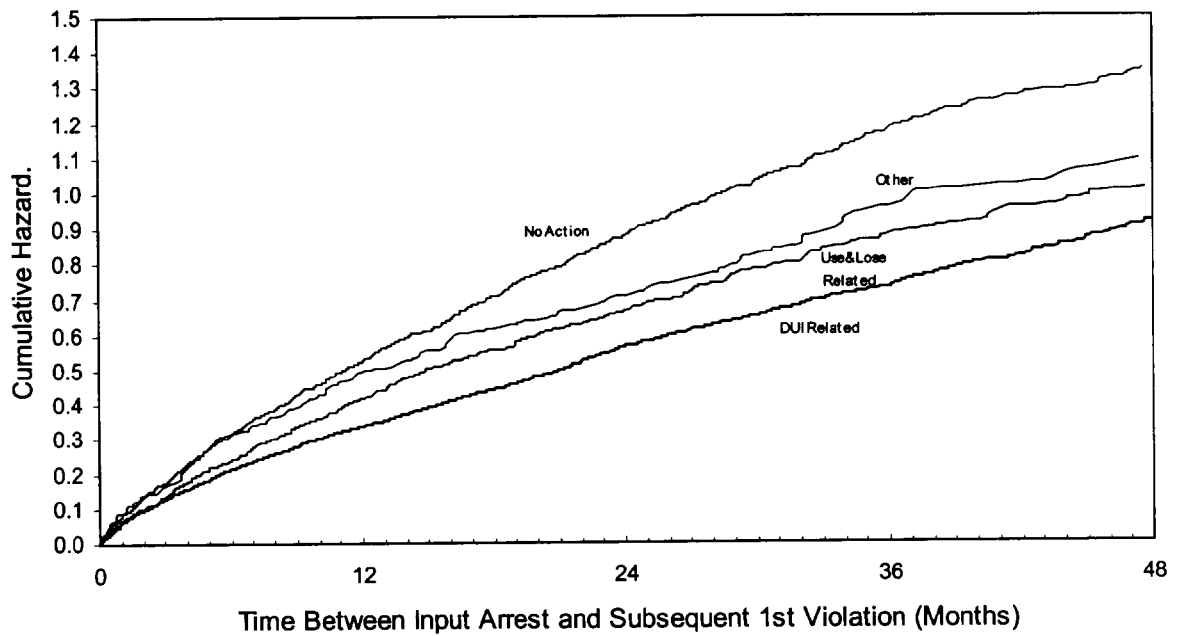


Figure 3. Cumulative Hazard Rate for Subsequent 1st Violation, By License Action Groups, Pennsylvania (N=5,690)



Proportional Hazards Analyses: Associations between Age or Gender or Driver's License Action Group with the Rate of Incidence of A Subsequent 1st Crash.

The results of the bivariate proportional hazards regression models showed that only age and license action group were statistically significant predictors for the rate of incidence of a subsequent 1st motor vehicle crash. The hazard ratio for subsequent 1st crashes over time, after the input arrest date, among 18.8 year-olds (25th percentile) vs. 20.3 year-olds (75th percentile) was 1.13 (95% CI, 1.01-1.25). Subjects who received a Use/Lose-related driver's license suspension were involved in a subsequent 1st crash at 0.66 (95% CI, 0.53-0.81), and those who received a DWI-related license suspension at 0.80 (95% CI, 0.70-0.92) times the rate of those who had no license actions. The rate of incidence of a subsequent 1st crash among those with other license actions did not vary significantly from those with no license actions (HR=0.74, 95% CI, 0.53-1.04). The difference based on gender was not statistically significant (HR=1.15, 0.93-1.42).

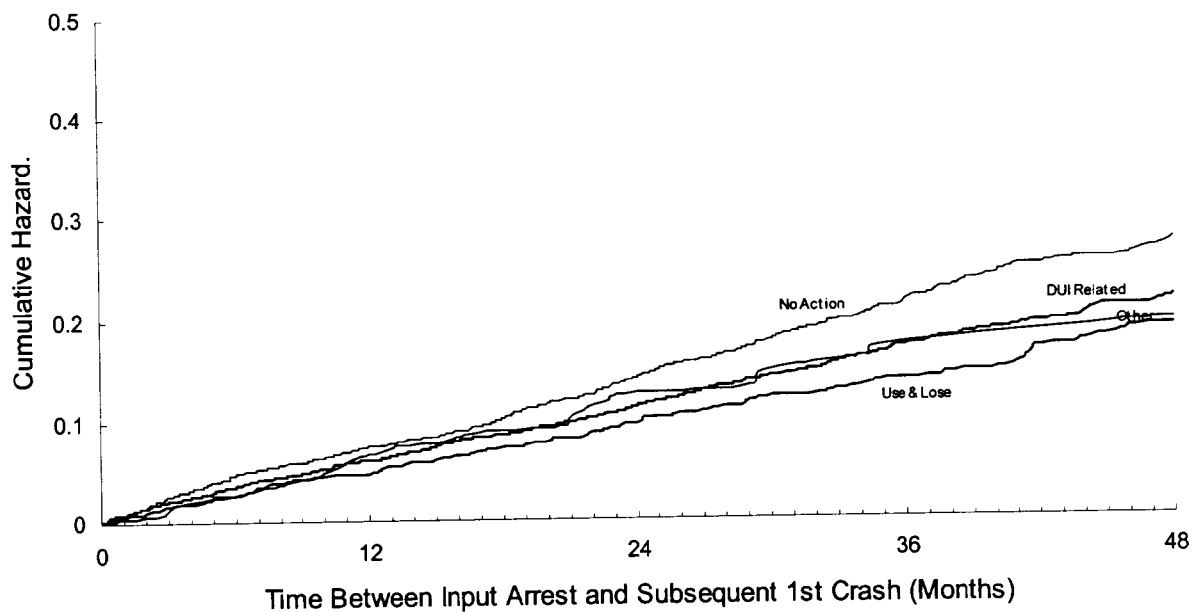
After controlling for all three independent variables, only age and driver's license action group were significantly associated with the rate of incidence of a subsequent 1st crash. Older offenders and those who had some driver's license actions applied to them had a lower rate than those who were younger and did not have any license action. For example, those who committed an input offense at 18.8 year-olds (25th percentile) had 1.12 times the rate of 20.3 year-olds (75th percentile) (HR=1.12, 95% CI, 1.00-1.25). Compared to the group with no license actions applied, the group with Use/Lose-related license actions had the lowest rate (HR=0.66, 95% CI, 0.53-0.82), and the group with DWI-related license actions had the second lowest rate (HR=0.83, 0.72-0.95). The group that received other license actions had a rate that was not significantly different from the rate of those with no license actions applied (HR=0.74, 0.52-1.04). Table 11 summarizes these results. Figure 4 depicts the plots of the rates of incidence of a subsequent 1st crash after the input arrest for the four license action groups.

Table 11. Proportional Hazards Model: Age or Gender or Driver's License Action Group as Predictors of Rate of Incidence of 1st Subsequent Crash, Pennsylvania (N=5,690)

Characteristic	Crude HR, 95% CI	p-value	Adjusted HR, 95% CI	p-value
Age	0.92 (0.86, 0.99)	0.031	0.93 (0.86, 1.00)	0.044
Gender				
Male	1.15 (0.93, 1.42)	0.199		
Female				
License Action Group				
None				
Use/Lose-related	0.65 (0.53, 0.81)	0.000	0.66 (0.53, 0.82)	0.000
DWI-related	0.80 (0.70, 0.92)	0.001	0.83 (0.72, 0.95)	0.007
Other	0.74 (0.53, 1.04)	0.078	0.74 (0.52, 1.04)	0.085

◊-2Log likelihood=16241.183, p=0.000 (Model includes age and license action group)

Figure 4. Cumulative Hazard Rate for Subsequent 1st Crash By License Action Groups, Pennsylvania (N=5690)



IV. DISCUSSION

In Missouri, DWI offenses are among the charges included in the state's Abuse and Lose law. The data obtained from Missouri showed that a driver's license action took place in the large majority of these cases (85%), while a licensing action was rarely reported with charges of possession or use of alcohol (16%) or possession or use of a controlled substance (14%). Unfortunately, this resulted in small numbers of cases in the comparison groups. In the most extreme instance, there were only 37 persons charged with possession or use of controlled substances who had undergone a licensing action. The analysis of subsequent traffic violations between those who did or did not undergo license action showed fewer subsequent violations within the suspension group. However, differences were not significant when calculated separately within each of the three charge types.

The Pennsylvania data set proved to be more robust. Almost all of the Use and Lose charges were for purchase, consumption, possession or transportation of alcohol. Unlike Missouri, DWI is not a Use and Lose law charge in Pennsylvania. However, it was found that about one-half of the Use and Lose charges were made in the context of a DWI arrest. That is, the driving records showed a DWI arrest and license action stemming from an arrest on the same date as the arrest on the Use and Lose charge. The other one-half of the cases were not DWI associated. About one-third of all of the cases did not undergo license action.

The Pennsylvania records did not indicate if and when a suspended or revoked license had been reinstated, so the actual term of the license suspension could not be determined. Nominally in the state, DWI carries a 1-year license suspension for a first offense conviction. However, Pennsylvania has an Accelerated Rehabilitation Disposition under which the court can order license withdrawal for a period of 1 to 12 months. As noted, a first offense Use and Lose conviction carries a 90 day license suspension or delay in licensing. It is possible, therefore, that some of those undergoing a Use and Lose suspension not associated with a DWI event may actually have been suspended for a longer period than some of those that were associated with DWI. It is most likely, however, that the average suspension length in the DWI associated group was greater than in the Use and Lose suspended group.

The results in Pennsylvania showed that those who underwent a license action were statistically less likely to receive a subsequent traffic violation conviction. The DWI associated group was the least likely to have a subsequent conviction, followed by the Use and Lose and the "other reason" suspended groups, compared to the group that had no driver's license action. Regarding subsequent crashes, the Use and Lose suspended group was the least likely to have a subsequent crash followed by the DWI associated group. The "other reason" suspended group did not differ significantly from the no license action group. These outcomes can be summarized as follows:

Proportion with Subsequent Violation	Proportion with Subsequent Crash
DWI Related - 54.7%	Use and Lose Related - 14.4%
Use and Lose Related - 59.8%	DWI Related - 17.0%
Other Suspension - 62.4%	Other Suspension - Not Significant
No Suspension - 70.8%	No Suspension - 21.2%

Males more so than females, and younger more so than older drivers, were found to have subsequent violations irrespective of license action. No gender differences were found regarding subsequent crashes (OR and HR were not significant). Age differences were not significant in the odds of having a subsequent crash (OR was not significant), but marginally significant in the likelihood of having a first subsequent crash (HR was significant). The outcome regarding violations is consistent with the general view that young males are among the highest risk driver groups. Motor vehicle crashes are relatively rare events compared to traffic violations. The outcomes regarding subsequent crashes are directionally the same as for violations. Whether an unequivocal effect would have been detected if a much larger sample was available remains conjecture, however.

Conclusion

Young persons examined in the present study had been arrested on charges of alcohol and substance abuse, often including DWI. In both states, the majority of these persons had traffic violation convictions prior to the input arrest and a large minority had a previous action taken against their driver's license. Also in Pennsylvania, about one in four had a previous motor vehicle crash.

These circumstances suggest that the study population was a high risk one from the highway safety point of view. The findings in Pennsylvania that license actions taken against this group do lead to fewer subsequent traffic violations and crashes provides additional evidence that the withdrawal of driving privileges is an effective driver control measure. While the study findings do not comment on the possible deterrent effects of Use and Lose laws on substance abuse by young persons, the application of license actions do lead to fewer subsequent traffic violations and crashes by this high risk group.

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APPENDIX A. STATE LAW SUMMARY

<u>State</u>	<u>Drug Law License Action¹ 23 USC Section 159</u>	<u>Use and Lose Applicable to Youth²</u>
Alabama	Yes	3 to 6 month license suspension for purchase, possession or consumption of alcohol.
Alaska	No	90 day revocation or delay for possession or use of drugs or alcohol.
Arizona	No	-
Arkansas	Yes	Persons under 18, one year suspension or delay, or until 18 th birthday if longer, for possession or use of controlled substances.
California	No	1 year suspension or delay for possession of controlled substances or alcohol.
Colorado	No	3 month revocation for felony possession of controlled substances (applicable to any age). 3 month revocation for possession of alcohol by persons under 21.
Connecticut	No	-
Delaware	Yes	30 day suspension for alcohol possession or consumption.
District of Columbia	Yes	30 day suspension of driving privileges for purchase, possession or consumption of alcohol.
Florida	Yes	-
Georgia	Yes	6 month revocation for alcohol purchase.
Hawaii	No	-
Idaho	No	1 year suspension for purchase, possession or consumption of alcohol.
Illinois	No	-

Indiana	Yes	90 day suspension for purchase of alcohol.
Iowa	Yes	-
Kansas	No	Courts may revoke licenses or privilege to operate of minors adjudicated as juvenile offenders.
Kentucky	No	1 year revocation for persons ages 14 to 17 for possession of controlled substances.
Louisiana	No	90 day suspension of persons ages 13-19 for possession of alcohol or controlled substances.
Maine	No	Court may suspend license or right to operate of juveniles convicted for possession of controlled substances.
Maryland	No	30 day suspension for possession of alcohol.
Massachusetts	Yes	90 day suspension for possession of alcohol.
Michigan	No	90 day suspension for purchase or suspension of alcohol.
Minnesota	No	90 day suspension for purchase or possession of alcohol.
Mississippi	Yes	-
Missouri	No	90 day suspension for possession or use of a controlled substance, or possession of alcohol while operating a motor vehicle.
Montana	No	30 to 90 day suspension of persons under age 18 for possession or consumption of alcohol or controlled substances if the person was driving when the offense occurred. Suspension of not more than 60 days for persons age 18 and older.
Nebraska	No	-

Nevada	No	90 day suspension or delay for persons under age 18 for purchase, possession or consumption of alcohol or possessing, using, selling or distributing a controlled substance.
New Hampshire	No	90 day revocation or delay for persons age 15-17 for possession, sale, using or abusing alcohol or a controlled substance.
New Jersey	Yes	6 month suspension or delay for purchase, possession or consumption of alcohol.
New Mexico	No	90 day revocation may be imposed for purchase, possession or consumption of alcohol, or controlled substances.
New York	Yes	-
North Carolina	No	1 year revocation for purchase of alcohol.
North Dakota	No	-
Ohio	Yes	-
Oklahoma	Yes	6 month revocation for person under age 18 for possession, purchase, use, transportation of controlled substances or alcohol.
Oregon	No	1 year suspension of driving privileges of persons under age 18 for possession or use of controlled substances or alcohol.
Pennsylvania	Yes	90 day suspension or delay for purchase, consumption, possession or transportation of alcohol.
Rhode Island	No	3 month suspension for purchase, consumption or possession of alcohol.
South Carolina	Yes	90 day suspension for possession, sale or consumption of alcohol.
South Dakota	No	6 month suspension for possession of alcohol in a motor vehicle.

Tennessee	No	90 day denial of driving privileges for persons under 18 for possession, use, sale of alcohol.
Texas	Yes	30 day suspension or delay for purchase, consumption or possession of alcohol.
Utah	No	90 day suspension of persons under 18 for purchase, possession or consumption of alcohol.
Vermont	No	-
Virginia	Yes	License may be suspended for up to 1 year for purchase or possession of alcohol.
Washington	No	License revocation up to one year of persons under age 18 for purchase, use or possession of alcohol or drugs.
West Virginia	No	-
Wisconsin	Yes	90 day suspension for purchase, consumption or possession of alcohol.
Wyoming	No	-

Source: NHTSA

¹ States marked “Yes” are those that require a 6-month license suspension, revocation or licensing delay for persons convicted for violation of the Controlled Substances Act, or any drug offense per 23 USC Section 159. States marked “No” are those that have certified that the Governor and legislature are opposed to the enactment of such a law (2000 data).

² Under the age of 21 unless noted. License action periods are for a first offense. The term “delay” is used to indicate that unlicensed violators will be delayed in time before they can obtain a license (2000 data).

APPENDIX B. TEXT OF MISSOURI AND PENNSYLVANIA LAWS

Abuse and Lose, Missouri Revised Statutes Section 577.500. Suspension or revocation of driving privileges, persons under twenty- one years of age – violation of certain laws – surrender of licenses – court to forward to director of revenue – period of suspension.

1. A court of competent jurisdiction shall, upon a plea of guilty, conviction or finding of guilt, or, if the court is a juvenile court, upon a finding of fact that the offense was committed by a juvenile, enter an order suspending or revoking the driving privileges of any person determined to have committed one of the following offenses and who, at the time said offense was committed, was under twenty-one years of age:

(1) Any alcohol related traffic offense in violation of state law or a county or, beginning July 1, 1992, municipal ordinance, where the judge in such case was an attorney and the defendant was represented by or waived the right to an attorney in writing;

(2) Any offense in violation of state law or, beginning July 1, 1992, a county or municipal ordinance, where the judge in such case was an attorney and the defendant was represented by or waived the right to an attorney in writing, involving the possession or use of alcohol, committed while operating a motor vehicle;

(3) Any offense involving the possession or use of a controlled substance as defined in chapter 195, RSMo, in violation of the state law, or beginning July 1, 1992, a county or municipal ordinance, where the judge in such case was an attorney and the defendant was represented by or waived the right to attorney in writing;

(4) Any offense involving the alternation, modification or misrepresentation of a license to operate a motor vehicle in violation of section 311.328, RSMo;

(5) Any offense in violation of state law or, beginning July 1, 1992, a county or municipal ordinance, where the judge in such case was an attorney and the defendant was represented by or waived the right to an attorney in writing, involving the possession or use of alcohol for a second time; except that a determination of guilt or its equivalent shall have been made for the first offense and both offenses shall have been committed by the person when the person was under eighteen years of age.

2. The court shall require the surrender to it of any license to operate a motor vehicle then held by any person against whom a court has entered an order suspending or revoking driving privileges under subsection 1 of this section.

3. The court, if other than a juvenile court, shall forward to the director of revenue the order of suspension or revocation of driving privileges and any licenses acquired under subsection 2 of this section.

4. (1) The court, if a juvenile court, shall forward to the director of revenue the order of suspension or revocation of driving privileges and any licenses acquired under section 2 of this section for any person sixteen years of age or older, the provisions of chapter 211, RSMo, to the contrary notwithstanding.

(2) The court, if a juvenile court, shall hold the order of suspension or revocation of driving privileges for any person less than sixteen years of age until thirty days before the person's sixteenth birthday, at which time the juvenile court shall forward to the director of revenue the order of suspension or revocation of driving privileges, the provision of chapter 211, RSMo, to the contrary notwithstanding.

5. The period of suspension for a first offense under this section shall be ninety days. Any second or subsequent offense under this section shall result in revocation of the offender's driving privileges for one year.

Pennsylvania Crimes Code-Title 18, Section 6310.4 Restriction of Operating Privilege

(A) **General rule** - Whenever a person is convicted or is adjudicated delinquent or is admitted to any preadjudication program for violation of section 6307 (relating to misrepresentation of age to secure liquor or malt or brewed beverages), 6308 (relating to purchase, consumption, possession or transportation of liquor or malt or brewed beverages) or 6310.3 (relating to carrying a false identification card) the court, including a court not of record if it is exercising jurisdiction pursuant to 42 Pa.C.S section 1515(a) (relating to jurisdiction and venue) shall order the operating privilege of the person suspended. A copy of the order shall be transmitted to the Department of Transportation.

(B) **Duration of suspension**- When the department suspends the operating privilege of a person under subsection (a), the duration of the suspension shall be as follows:

- (1) For a first offense, a period of 90 days from the date of suspension.
- (2) For a second offense, a period of one year from the date of suspension.
- (3) For a third offense, and any offense thereafter, a period of two years from the date of suspension. Any multiple sentences imposed shall be served consecutively.

Reinstatement of operating privilege shall be governed by 75 Pa.C.S. section 1545 (relating to restoration of operating privilege).

(C) **Nondrivers**- Any person whose record is received by the department under subsection (a) and who does not have a driver's license shall be ineligible to apply for a learner's permit under 75 Pa.C.S. sections 1505 (relating to learners' permits) and 1507 (relating to application for driver's license or learner's permit by minor) for the time periods specified in subsection (b). If the person is under 16 years of age when he is convicted or adjudicated delinquent or admitted to a preadjudication program, his suspension of operating privileges shall commence upon his 16th birthday for the time periods specified in subsection (b).

APPENDIX C. AGE AND GENDER INTERACTIONS

Table C-1. Interaction Between Age and Gender, Subsequent Violation, Pennsylvania (N=5,690)

Characteristic	Parameter Estimate	SE	Odds Ratio (CI)	p-value
Age	-0.279	0.035	0.757 (0.707, 0.810)	0.000
Gender:				
Male				
Female	-2.434	2.069	0.088 (0.002, 5.065)	0.240
Age*Gender	0.089	0.106	1.093 (0.888, 1.345)	0.400

$2*[LL(N)-LL(0)]=129.713, p=0.000$

Table C-2, Interaction Between Age and Gender, Subsequent Crash, Pennsylvania (N=5,690)

Characteristic	Parameter Estimate	SE	Odds Ratio (CI)	p-value
Age	-0.078	0.043	0.925 (0.850, 1.006)	0.070
Gender:				
Male				
Female	-2.023	2.780	0.132 (0.001, 30.720)	0.467
Age*Gender	0.095	0.142	1.100 (0.832, 1.453)	0.503

$2*[LL(N)-LL(0)]=5.312, p=0.150$