Accident Analysis and Prevention 100 (2017) 44–52

Contents lists available at ScienceDirect

Accident Analysis and Prevention

journal homepage: www.elsevier.com/locate/aap

An evaluation of Nova Scotia's alcohol ignition interlock program

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ARTICLE INFO

Article history:
Received 18 July 2016
Received in revised form 8 December 2016
Accepted 23 December 2016

Keywords:
Ignition interlock
Drinking driving
Program evaluation
Crash

ABSTRACT

Alcohol ignition interlock programs for offenders aim to reduce recidivism among convicted drink drivers. This study presents an evaluation of Nova Scotia's interlock program implemented in 2008 in order to assess its effectiveness to reduce impaired driving and to help identify areas for improvement. Data used include conviction and crash records of individual participants; provincial monthly counts of alcohol-related charges, convictions and fatal and serious crashes; and interlock logged events. Methods used include descriptive statistics, survival analysis, time series and logistic regression analysis. With respect to specific deterrence (i.e., preventing recidivism) there was a 90% reduction in recidivism among voluntary participants since participation in the interlock program and a 79% reduction after these participants exited from the program. With respect to general deterrence (i.e., referring to a preventative effect on the entire population of drivers in Nova Scotia) there were temporary decreases in the numbers of alcohol-related charges (13.32%) and convictions (9.93%) and a small significant decrease in the number of fatal and serious injury alcohol-related crashes, following the implementation of the program. The evidence suggests the interlock program was better at preventing harm due to alcohol-impaired driving than the alternative of not using the interlock program. Recommendations were formulated supporting the continuation of the interlock program in Nova Scotia.

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1. Introduction

An alcohol interlock device is meant to prevent drivers from starting their vehicles if they have been drinking. The device requires the driver to blow into a breath alcohol testing device connected to the starter or other on-board computer system in order to start the vehicle and also requires repeated breath tests while the vehicle is in use to ensure the driver continues to remain sober.

Research has demonstrated that alcohol ignition interlocks can be very effective to combat alcohol-impaired driving (e.g., Marques et al., 2010; Rauch et al., 2011; Zador et al., 2011). A systematic review of 15 scientific studies conducted by the Centers for Disease Control and Prevention (CDC) found that while interlocks were installed, the re-arrest rate of offenders decreased by 67% compared to groups that did not have the device installed (Elder et al., 2011). A meta-analysis of interlock program evaluations found an average reduction of recidivism of 64% (Willis et al., 2004). Regarding the impact of interlocks on crashes, the systematic review of the literature conducted for the CDC (Elder et al., 2011) revealed limited evidence that alcohol-related crashes decrease while the interlock device is installed. McCartt et al. (2013) reported an 8.3% reduction in single-vehicle late-night crash risk (a proxy for alcohol-related crashes) associated to a change in the law in Washington State in 2004 that extended the interlock order requirement to first time offenders with blood alcohol concentrations (BACs) below 0.15%. More recently, Kaufman and Wiebe (2016) investigated the impact of state ignition interlock laws on alcohol-involved crash deaths in the U.S. using data from 1999 to 2013 and found that requiring ignition interlocks for all drunk-driving convictions was associated with 15% fewer alcohol-involved crash deaths, compared to states with less-stringent requirements.

Compliance with the interlock device tends to be low at the beginning of Alcohol Ignition Interlock Program (AIIP) participation when offenders often try to circumvent the alcohol interlock or fail to provide the required level for the breath test. However, research indicates that the non-compliance decreases over time as the offender becomes more used to the device and gains an understanding of the sophisticated technology involved and the futility of trying to circumvent the device (Vanlaar et al., 2010; Vanlaar et al., 2013). Zador et al. (2011) found that non-compliance could be reduced through close supervision, installation of a data logger,

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http://dx.doi.org/10.1016/j.aap.2016.12.017
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the provision of thorough interlock training at the time of device installation, and the provision of information to offenders regarding the consequences of circumvention, refusals, and failed breath tests.

Research is ongoing to identify the effective features of AIIPs. A recent study of AIIPs across 28 states in the U.S. shows that requirements which cover more types of offenders, especially first-time offenders, were strongly associated with interlock use increases (Casanova-Powell et al., 2015). The same study found that other key features (monitoring, coordination, uniformity and education) were moderately to strongly related (correlations larger than 0.3) to higher interlock-in-use rates (interlocks in use per 10,000 population, per 100 Driving While Impaired or DWI arrests, and per DWI fatality). Other collaborative initiatives that involve researchers, practitioners and government agencies are beginning to identify much-needed guidelines for programs based on existing knowledge and new experiences (National Highway Traffic Safety Administration, 2013).

In September 2008, Nova Scotia's AIIP was implemented with the objective to improve road safety and reduce the number of road traffic crashes and fatalities that may occur due to alcohol-impaired driving. Prior to enrolling in the AIIP, the DWI offender must register in the Alcohol Rehabilitation Program by Addiction Services of Nova Scotia. In this program, participants attend two days of DWI education in a group setting, complete a bio-psycho-social assessment, complete the Research Institute on Addictions Self-Inventory (RIASI; see Nochajski, 2002) and obtain a risk rating. Nova Scotia's AIIP involves both voluntary and mandatory components. It is voluntary for first-time offenders convicted once of drink driving or of refusing a breathalyzer test, and who were also deemed to be a 'low' or 'medium' risk as per Addiction Services' bio-psycho-social assessment. Mandatory participants are those who are repeat offenders or who are deemed to be a 'high' risk according to Addiction Services. After entering the program, participants must have an alcohol interlock device installed on their vehicle(s). They then receive an interlock licence and must participate in ongoing rehabilitation counseling sessions throughout the interlock period. During the sessions, a specific treatment plan is tailored to the individual needs of the offender, and a review is conducted of the data log from the interlock device.

In 2010 a process evaluation was finalized to obtain an understanding about how Nova Scotia's AIIP was developed and implemented (Robertson et al., 2010). Overall, the results revealed that the implementation of the AIIP in Nova Scotia proceeded according to the plan. This study presents the results of the outcome evaluation of Nova Scotia's AIIP. Specifically, the outcome evaluation was conducted to determine the use of the program, its effectiveness to reduce drink driving when combined with counselling and other services provided to the offender, and to identify potential improvements to the program. The results presented here augment the results previously reported (Vanlaar et al., 2014) with an additional year of crash data.

2. Methods

2.1. Data

Different types of data were used in this evaluation. First, different groups were formed: two experimental interlock groups (929 voluntary and mandatory interlock offenders) and a control group (326 non-interlock offenders). The interlock participants were recruited among those who entered in the AIIP from March 2010 to December 2012. The non-interlock participants were recruited during the same period among offenders that had the option to participate in the interlock program but declined and remained with their driving license suspended during their revocation period. For all participants, driver licensing information, individual crashes and convictions were collected from the Registry of Motor Vehicles in Nova Scotia. These data were tracked from their participation in the study up until June 30th, 2014.

Provincial monthly counts of alcohol-related charges, convictions and fatal and serious injury crashes were analyzed. The monthly counts of charges and convictions from 1998 to 2013 were obtained from Justice Nova Scotia. The monthly counts of fatal and serious injury crashes from 1998 to 2011 were obtained from the Traffic Injury Research Foundation's National Fatality and Serious Injury Databases. Alcohol involvement in a fatal crash was determined based on blood samples from coroners' offices and medical examiners' offices in Canada. This information was used in combination with police reported data to obtain a valid estimate of alcohol involvement. For serious injury crashes, when coroner's data are not available, police reported alcohol involvement is verified against a surrogate measure of the alcohol involvement (i.e., if the crash involved a single vehicle at night, from 9:00 pm to 6:00) – for more information about the methodology of these databases, see Brown et al. (2015).

For each of the alcohol-related data, corresponding non-alcohol-related control data was included in the analyses. Furthermore, other confounding variables were also included to control for their possible impact:

- Population: Population estimates by quarters, aged 16 and over, 1998 to 2013 (Statistics Canada, Table 051-0001);
- Unemployment rate: Monthly percentage of adults aged 15 and over in the labour force that is unemployed (Statistics Canada, Table 282-0087);
- Heavy drinking: Annual population aged 12 and over who reported having 5 or more drinks on one occasion, at least once a month in the past 12 months, 1998 to 2012 (Statistics Canada, Table 282-0087); and,
- Alcohol sales: Average litres bought annually by adults aged 15 and older, 1998-2013 (Statistics Canada, Table 105-0501 and Catalogue no. 82-221-X).

Finally, interlock data for 1323 participants in the AIIP from November 2008 to December 2012 were also analyzed. The interlock data were obtained from Alcohol Countermeasure Systems Corp. and consisted of events logged in the interlock device. These events were the results from breath tests when trying to start the car (start-up) or after having started the car (running retest).

2.2. Study design

The study design was a longitudinal study whereby data from the two experimental groups were compared across several measures with data from the control group. The longitudinal data from the experimental and control groups were analyzed using a variety of survival analysis techniques. This allowed for the comparison of the behaviour of interlocked offenders with non-interlocked offenders in the control group, in order to draw conclusions about the impact of the program. Accounting for the potential influence of other possible factors was achieved by including control variables (e.g., demographic information). Survival analysis made it possible to distinguish between short-term and long-term safety effects by using time until an event occurred as useful information in the analyses.

Time series analyses were also used to bolster the findings from the survival analyses. It made it possible to obtain a better understanding of long-term trends by controlling for factors that may have influenced the results such as population, unemployment, heavy drinking and alcohol sales. These analyses were performed

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