



STATUS OF ALCOHOL-IMPAIRED DRIVING IN CANADA



The knowledge source for safe driving

The Traffic Injury Research Foundation

The mission of the Traffic Injury Research Foundation (TIRF) is to reduce traffic-related deaths and injuries. TIRF is an independent, charitable road safety research institute. Since its inception in 1964, TIRF has become internationally recognized for its accomplishments in identifying the causes of road crashes and developing program and policies to address them effectively.



This initiative was made possible by a charitable contribution from Beer Canada.

Traffic Injury Research Foundation
171 Nepean Street, Suite 200
Ottawa, Ontario K2P 0B4
Ph: (613) 238-5235
Fax: (613) 238-5292
Email: tirf@tirf.ca
Website: www.tirf.ca

Traffic Injury Research Foundation
Copyright © July 2018
ISBN: 978-1-988945-61-3

STATUS OF ALCOHOL-IMPAIRED DRIVING IN CANADA

Robyn D. Robertson, Steve W. Brown, Devon Valentine and Ward G.M. Vanlaar

TABLE OF CONTENTS

INTRODUCTION	1
SYNTHESIS OF KEY CONSIDERATIONS	3
Multiple data sources show that impaired driving has declined for more than a decade	3
Public concern about drinking and driving has declined and has shifted to other road safety priorities	6
The emergence of new issues has implications for resource allocation	7
Data show criminal courts are overwhelmed and impaired driving cases are resource-intensive	10
Provincial/territorial administrative regimes and other evidence-based impaired driving countermeasures are integral features of Canada's impaired driving strategy and offer important benefits	11
CONCLUSIONS	15
REFERENCES	17



INTRODUCTION

Alcohol-impaired driving has been a leading contributor to road crashes for three decades. During this period, progress reducing crashes involving fatal and serious injuries has been achieved and, today, fewer Canadians self-report driving after drinking when they thought they were over the legal limit. While this outcome represents an important milestone, it must be acknowledged that the scope of the problem has changed and Canadians should not become complacent about it.

A renewed focus on alcohol-impaired driving emerged in April 2017 as the Canadian Federal Government introduced Bill C-45 or the “Cannabis Act”, which proposed the legalization of possession, growing, selling, and consumption of cannabis (Bill C-45). Media reports have long indicated that this legislation was slated to become law by August 2018, although a delay is now anticipated due to significant public health and safety concerns that are shared by Federal and Provincial policymakers, agency staff and many Canadians. The potential consequences for road safety are equally profound in light of a substantial body of evidence which demonstrates cannabis impairs driving ability to varying degrees. In addition to Bill C-45, the Canadian Government also seeks to pass Bill C-46 which contains regulations proposed by the Canadian Government to manage impaired driving resulting from cannabis and other drugs (Bill C-46).

Prior to the passage of Bills C-45 and C-46, and in light of data that reveal drug-impaired driving has increased (Robertson et al. 2016), it is timely to review and assess the current status of the alcohol-impaired driving problem to determine what progress has been achieved and what gaps within the criminal justice system remain. The purpose of this report is to summarize relevant Canadian data about alcohol-impaired driving that can inform discussion regarding drug-impaired driving legislation. With the upcoming legalization of cannabis and the proposed Bill C-46, it is paramount that Canada’s impaired driving regime continues to be robust at this critical period to ensure progress continues and unintended negative consequences are avoided.

This report examines current data and trends in alcohol-impaired driving across Canada, and highlights areas where declines have been achieved as well as specific areas where the problem persists. It also explores public perceptions about impaired driving in Canada and notes a decline in concern regarding this issue. In addition, this report considers the enforcement of impaired driving laws across Canada and analyzes the various challenges facing police agencies in terms of road safety enforcement and the number of competing priorities. This analysis is considered in the context of the existing burden on the court system, particularly as a result of the recent *R. v. Jordan* decision, and highlights significant public safety concerns in Canada due to impaired driving.

In this report, several strategies that can help resolve some of these issues are summarized. Specifically, the use of administrative regimes in combination with criminal prosecution has demonstrable benefits which warrant consideration. Administrative strategies are an efficient solution, and programs have evolved to respond to escalating offences. There are also underused alternative sanctions, such as ignition interlocks and remedial programs, which have proven long-term risk reduction effects. It is important that reductions continue to be achieved and burdens on the justice system which can erode the deterrent effects, particularly among repeat offenders, are mitigated.

In summary, although impaired driving in Canada has generally declined, there are several key considerations to examine in light of this proposed legislation which warrants concern. At the same time, there are also alternative strategies that can help relieve some of the pressure on the criminal justice system. This analysis underscores that impaired driving is a multi-faceted and complex social issue that remains a relevant public safety concern. As this initiative to legalize cannabis proceeds, it is critical that Canadian legislators, law enforcement, criminal justice professionals, and the general public understand the current status of the alcohol-impaired driving problem.



SYNTHESIS OF KEY CONSIDERATIONS

Multiple data sources show that impaired driving has declined for more than a decade.

Impaired driving can be measured using a variety of indicators from different data sources, including fatal crash data, police charge data, and self-reported survey data. Each of these indicators provides an important window on the problem. An examination of trends associated with each of these indicators suggests that impaired driving has generally declined in Canada for more than a decade.

Alcohol-related fatal crashes. Data from the Traffic Injury Research Foundation's (TIRF) National Fatality Database includes police-reported crash data combined with alcohol and drug test data collected from coroners and medical examiners in every jurisdiction. The testing rate for alcohol use among fatally injured drivers has been substantial in comparison to other countries, ranging from 85% to 88% for more than a decade. In 2014, the testing rate was 87.7%.

An analysis of national trends in alcohol-related crashes from 2000 to 2014 was undertaken by TIRF to share the most accurate and current data. The analysis for each indicator during this period is provided excluding British Columbia since the BC Coroners Service has not provided alcohol or drug test results for individuals involved in fatal crashes since 2010. However, an analysis of motor vehicle fatality victims in BC during 2000 to 2010 showed that BC represented 15.7% of total fatalities; and 16.6% of alcohol-related fatalities. In addition, trends in BC during this period mirrored national results, and more recent data from the Insurance Corporation of British Columbia (ICBC) has suggested that declines in impaired driving in BC have been more pronounced as compared to the rest of Canada during 2010-2014. In short, BC represents a shrinking proportion of alcohol-related fatalities, and testing rates in BC were also slightly higher than the national average at 88%.

An analysis of trends from 2000 to 2014 showed a continued and consistent decline in the number and percentage of fatally injured drivers who had been drinking. For instance, the number of fatally injured

There was a consistent decline in the number and percentage of fatally injured drivers who had been drinking between 2000 and 2014.

male drivers who tested positive for alcohol and had a blood alcohol concentration (BAC)

above the .08 threshold in 2000 was 311, or 32.7% of all drivers tested who were in highway vehicles both on and off the road. This number dropped in 2014 to 191, or 26.9% of all drivers tested. The number

of fatally injured female drivers who tested positive for alcohol also decreased from 33 in 2000 to 22 in 2014. This conclusion can be reached because female drivers have accounted for 13%-16% of all fatally injured drivers in Canada since 2002, with the exception of 2006 when that number rose to 16.4% (Robertson et al. 2014). Therefore, this decline remains true when looking at drinking driver fatalities per 100,000 population and per 100,000 licensed drivers.

Average number and proportion of road fatalities involving a drinking driver. The above mentioned decreasing trend is equally apparent when considering the percentage of persons killed in a traffic crash in Canada involving a drinking driver although this decline is less pronounced (Vanlaar et al. 2012; Brown et al. 2015). Trend analysis (excluding BC) reveals a general decline from 2000 to 2014 with few fluctuations. The total number of fatalities involving a drinking driver declined from 721 to 421 during this period. The percentage of total road fatalities involving a drinking driver decreased from 29.8% to 27.0%, representing a 9.4% decline. Moreover, preliminary data from 2015 has indicated a continued decline in the number of fatalities involving a drinking driver, and a smaller decline in the percentage of fatalities.

It should be underscored that if the number of drinking pedestrians killed by a sober driver is also added to this total, then the total proportion of alcohol-related crashes relative to total crashes would increase to 29.6% in 2014.

40.8%

DECLINE IN THE NUMBER OF
ALCOHOL-RELATED FATALITIES

In summary, there has been a 40.8% decline in the number of alcohol-related fatalities between 2000 and 2014; during this same period, the total number of all road fatalities declined by 34.7%. This means that a true decrease has occurred that cannot be explained by the general downward trend across all types of road crashes.

Blood alcohol concentration of drivers killed in fatal crashes. The average blood alcohol concentration (BAC) among fatally injured drinking drivers who were tested for alcohol has consistently been .17 over the past decade. Similar to other indicators, the percent of fatally injured drivers with BACs over the legal limit of .08 also generally decreased from 28.4% in 2000 to 24.2% in 2013.

Most recently, an analysis of 2014 data regarding the average BAC of drivers killed in fatal crashes showed that 28.5% of drivers who were tested were drinking (as compared to 34.8% in 2000). Among these drivers who tested positive, more than four-fifths (83.2%) of them had a BAC over .08 (84.3% in BC) whereas 16.7% had a BAC between .01 and .08. In particular:

- > 3.5% were .01 to .049
- > 1.3% were .05 to .08
- > 7.3% were .081 to .16
- > 16.4% were above .16

($16.4 + 7.3 = 23.7$; $23.7 \times 100 / 28.5 = 83.2\%$)

These data are provided to demonstrate that the majority of drinking drivers in fatal crashes had a BAC well in excess of the current limit of .08.

BACs of pedestrians killed in fatal crashes. In comparison, the average BAC among fatally injured drinking pedestrians during this same 14-year period was .20, and approximately 35.7% (or 50 of 140) of pedestrians tested for alcohol had been drinking. Of note, the testing rate for alcohol among pedestrians in fatal crashes is lower at 58.6% but, on average, approximately 60% of pedestrians are tested each year. These data are presented to illustrate that alcohol impairment is a key factor in the deaths of the most vulnerable road users. Little progress has been made in reducing alcohol-related deaths and injuries among this population in the past decade which represents a significant concern.

Off-road vehicles. Additionally, while there appears to be a steady decline in alcohol-impaired driving among fatally injured drivers of on-road vehicles in Canada, less progress has been made in reducing

alcohol-impaired driving among fatally injured drivers of off-road vehicles. Specifically, this trend is noticeable when comparing BAC levels for fatally injured drivers of both groups from 2000 to 2014 who were tested for alcohol.

In 2000, 344 fatally injured drivers, or 28.5% of all drivers tested, of highway vehicles had a BAC greater than .08. In 2014 these numbers decreased to 213, or 24.1%. Conversely, nominal declines have been achieved for off-road vehicles. It was found that in 2000 the number of fatally injured off-road vehicle drivers with BACs above 0.08% was 43, or 45.7% of all drivers tested. In 2014 this number rose to 56, or 46.3% of all drivers tested. These data reveal that alcohol use has not decreased among off-road vehicle drivers during this 15-year period. Ultimately this suggests that although alcohol use has declined among on-road vehicle drivers, it has increased among off-road vehicle drivers and is a cause for concern.

Alcohol use has increased among off-road vehicle drivers and is a cause for concern.

Alcohol-impaired driving charges. Both the number and the rate of impaired driving charges (per 100,000 population) have declined since 1986. There were 72,039 police-reported impaired driving incidents in 2015 (or 201 incidents per 100,000 population). This rate represents a 4% decline from 2014 (210 per 100,000) and the 2015 rate is the lowest on record since impaired driving data were first collected in 1986 (-65%) (Perreault 2017).

However, there are certain exceptions to this declining trend. Although males have accounted for a majority of impaired driving arrests, in the past three decades there have been noticeable increases in alcohol-impaired driving incidents among women. Females accounted for just 1 in 13 impaired drivers in 1986 whereas from 2005 to 2011 women represented one in six impaired driving incidents (Perreault 2013), and in 2015 women accounted for one in five (Perreault 2017). These data demonstrate that, despite female impaired drivers representing a small percentage of the overall impaired driving population, there have been steady increases in female impaired driving in Canada since the 1980s. Nonetheless, it remains that the general trend across the entire population has been a decline in impaired driving charges.

While it may be argued that at least a portion of the decline in charges may be attributable to declining levels of enforcement, it is appropriate to look at impaired driving charges that are unaffected by declining levels of enforcement, such as impaired driving causing bodily harm or death. There has also been a substantial decline among these offences between 1986 (1,581 and 196 respectively) and 2014 (605 and 130 respectively). In 2015, there were 596 police-reported incidents of impaired driving causing bodily harm, and 122 incidents of impaired driving causing death. In other words, incidents of impaired driving causing bodily harm have declined 73% since 1986, and the number of impaired driving causing death incidents has decreased 55%.

Of importance, it is noted that the number of impaired driving causing death incidents is much lower than the number of fatalities involving a drinking driver since on average, in approximately 60% of these fatalities, the individual killed was the drinking driver. For example, in 2006, among the 758 fatalities, 56.7% of these deaths were the fatally injured drinking drivers. Similarly, in 2013, among the 475 deaths, 60.2% were the fatally injured drinking drivers.

Self-reported drinking and driving. Data from TIRF's Road Safety Monitor (RSM), an annual public opinion poll, conducted since 1998, further show that the percentage of those who reported driving after they thought they were over the legal limit has also generally declined. With the exception of 2010 and 2016, there are some clear, albeit only mildly pronounced trends that have emerged during this period.

From 1998 through to 2005, there was a downward trend in the proportion of drivers who admitted driving after consuming any amount of alcohol. However, an increasing trend is evident from 2005 through to 2011. That trend again reversed in 2011 and has since generally declined until 2015. There was a small increase from 4.2% in 2015 to 5.1% in 2017 of Canadians who self-reported drinking and driving when they thought they were over the legal limit in the past 12 months. However, this increase between 2015 and 2017 is not statistically significant. Both the consistency in the trend that has been observed and the results of significance tests suggest a continued decline since 2007 in the percentage of drivers in Canada

who admitted to driving while they thought they were over the legal limit in the past 12 months. In other words, the large majority of Canadians do not drink and drive (Brown et al. 2016).

These data are consistent with the results of the 2014 Canadian Community Health Survey (CCHS) conducted in Ontario, Manitoba, Alberta, Yukon and Nunavut. The survey queried whether respondents had driven a vehicle within an hour of consuming two or more alcoholic beverages. Results showed that 4.3% of respondents (or 1 in 20 drivers) reported that they had driven a motor vehicle under these conditions at least once in the past 12 months (Perreault 2017). In addition, results of this survey also showed a general decline since 2009 in the proportion of drivers of on-road vehicles who admitted to doing this.



Another notable finding from the CCHS is that three-quarters (76%) of drivers who reported driving after drinking more than once had done so at least twice, and 10% had done so on more than 10 occasions. On average, these respondents reported six occurrences of driving within two hours of drinking in the 12 months prior to the survey, indicating that 97% of drinking and driving incidents were caused by repeat offenders. This illustrates that persons who reported drinking and driving represented a very small proportion of drivers, however a majority of drinking and driving trips (Perreault 2017).

This evidence demonstrates that the deterrence achieved through the existing criminal .08 BAC is substantial. Multiple data sources confirm that impaired driving has declined across many indicators, particularly in the last decade. However, although this progress is encouraging, these data also demonstrates that some facets of the problem remain and continued attention is needed. Specifically, current impaired driving laws do not account for pedestrian fatalities when they are under the influence of alcohol. There has also been limited progress achieved in specific cohorts of impaired drivers, such as females and off-road vehicle drivers. These data illustrate that while measurable progress has been achieved in reducing impaired driving, challenges persist and as the problem evolves, more comprehensive strategies may be needed.

Public concern about drinking and driving has declined and has shifted to other road safety priorities.

In eight out of 12 years since 2006, when compared to other societal issues such as crime, the economy, and global warming, a decline was noted in the consistency in which drinking and driving was mentioned as the societal issue of greatest concern by Canadian drivers. Specifically, the price of gas was identified as the societal issue of greatest concern in three years (2011, 2012, and 2014) while the state of the health care system was mentioned as the top societal issue of concern in 2015. During the four years when drinking and driving was not mentioned as the foremost societal issue of concern, it was always the second-ranked issue among respondents.

Moreover, TIRF Road Safety Monitor survey data revealed that public concern about impaired driving in relation to other road safety issues has also continuously declined for several years. In fact, concern about drinking and driving was at its highest in 1998 at 88% compared to other years; it has remained below 85% since 2002. Specifically, the percentage of persons who are very or extremely concerned about this issue declined from 81.8% in 2006, reaching only 71.3% in 2011 (Brown et al. 2016). In fact, since 2010, concern about texting and driving has surpassed impaired driving.

Public concern about texting and driving has surpassed impaired driving.

From this perspective, it may be posited that concern about impaired driving has declined because a large proportion of the public has been deterred by current criminal and administrative regimes and there may be greater public confidence in these systems and their effectiveness. Only more recently, there have been

slight increases in concern since 2014, and this may have been prompted by a growing discussion about the legalization of cannabis.

These data suggest that impaired driving has declined as a public concern. Further, there has been a demonstrable shift in interests to other road safety issues. Although there has been a general decline in impaired driving across Canada, as mentioned previously there are still key cohorts of impaired drivers that continue their offending behaviour. For this reason, the decline in public concern about impaired driving represents a growing problem. Specifically, it has been noted that in order to effectively reduce alcohol-impaired driving there must be a consistent and sustained awareness of the issue among key stakeholders and the public. With public interest declining and shifting to other priorities, ensuring that progress previously achieved is not eroded may become a challenge. At the very least, these data indicate that the public needs to be re-engaged in the impaired driving issue and understand that although the number of impaired drivers is shrinking, the risk to public safety remains.

The emergence of new issues has implications for resource allocation.

The road safety landscape has shifted substantially in recent decades. For instance, new evidence about the impairing effects of drugs on driving, and the dangers posed by drug-impaired drivers, has become a growing priority in several jurisdictions. Additionally, more evidence is becoming available about the dangers of distracted driving. In light of these emerging issues, demands on police to enforce road safety laws have grown.

This is challenging because for the past several years police operating expenditures have either stagnated or declined. In fact, police spending has varied by less than 1% since 2011, and the per capita costs have remained virtually unchanged (Greenland & Alam 2017). For the past five years, the rate of police strength



per 100,000 has also been eroded. In 2016, the rate of police strength was 190 officers per 100,000 population, and this is the lowest rate since 2005. Conversely, the number of civilian staff in police services has shown continued growth and they now represent almost one-third (29%) of personnel employed by police services. However, civilian staff cannot enforce impaired driving laws (Greenland & Alam 2017).

Police officers are also aging and the proportion of officers aged 40 years and older has increased since 2012. In 2016, more than half (55%) of all police officers were over the age

of 40 years, and more officers retired (2,652) or otherwise departed their service in 2015, whereas there were fewer (2,630) police officers who were hired (Greenland & Alam 2017). This poses a challenge for several reasons which are described below.

Necessary levels of enforcement. An examination of random breath testing (RBT) research sheds insight into the necessary levels of enforcement that may be required. This example is used based on its inclusion in Bill C-46, and the assumption that the use of RBT will dramatically reduce court processing times for impaired driving cases if it may be applied without violation of Canadian and Provincial Labour Code statutes.

According to a systematic review of evaluations of RBT and sobriety checkpoints, an important caveat to the research about RBT was that there was limited evidence to suggest that RBT may be slightly more effective than Selective Breath Testing (SBT), since administering a breath test to all stopped drivers with RBT may create a stronger perception of being caught than the more selective approach with sobriety checkpoints. However, this study also attested that the evidence was not conclusive and pointed to the possible confounding effect of more intensive enforcement levels that have typically been used with RBT in Australia compared to those of SBT as an explanation for the difference in effectiveness (Fell et al. 2004).

Similarly, one particular study that provided some information regarding the effectiveness of RBT versus SBT comes from Australia where sobriety checkpoints were used before introducing RBT. This one

study concluded that RBT was more effective than SBT but also reported that the quality of data about enforcement levels was sometimes questionable. In other words, the observed difference in effectiveness between SBT and RBT could also be explained by different levels of enforcement (Henstridge et al. 1997). In essence, these important studies underscore that the effectiveness of RBT may be intimately linked to the level of enforcement that was applied. In Australian jurisdictions, research suggested that, on average, one in three drivers must be stopped on an annual basis and subject to RBT. In other words, for RBT to be effective in a country the size of Canada, the police would have to conduct an estimated seven million breath tests per year. Current enforcement levels are well below this level, and it would require considerable resources to achieve a significant increase in enforcement since not all officers in Canada have ready access to a breath testing device.

There are many competing enforcement priorities. Of greater concern, since 2008, there has been a new litany of Federal and Provincial road safety laws which police services have been tasked with enforcing. These include: alcohol and drug impaired driving, stunt driving, distracted driving, move-over laws and bicycle distance laws to name a few. As a consequence, the level of impaired driving enforcement has generally declined to make way for the enforcement of other high-priority concerns. Notable among these are drug-impaired driving laws and distracted driving laws, and the enforcement priorities in each of these areas are briefly summarized.

Drug-impaired driving places considerable demands on law enforcement. A recent report by TIRF on policy issues related to cannabis and driving (Robertson et al. 2016) identified several gaps in the existing enforcement of drug-impaired driving laws, and the inadequate number of trained, certified and active

500 DRUG RECOGNITION EVALUATOR (DRE)
OFFICERS FOR

22,000,000

LICENSED DRIVERS

police Drug Recognition Evaluator (DRE) officers, estimated at just 500 officers to enforce these laws for an approximately 22 million licensed drivers.

At present, reports from police services in several jurisdictions highlight that it is a regular occurrence to be unable to obtain a certified DRE officer upon request, and this has resulted in an inordinate number of suspected drug-impaired drivers being

permitted to continue driving in the absence of administrative sanctions to remove them from the road (Robertson et al. 2016).

There is also evidence that the peak periods of drug-impaired driving are distinct from alcohol-impaired driving which presents a related enforcement challenge. Whereas alcohol-impaired driving most often occurs on weekends (47% of incidents) and during evening hours between 11pm and 4am, research shows that less than one-third of drug-impaired driving incidents occurred on weekends, and while 28% of these incidents occurred between 11pm and 4am, an equal proportion of incidents occurred between 6pm and 11pm (Perreault 2017; TIRF 2017). These data demonstrate that drug-impaired driving enforcement cannot merely overlap with alcohol-impaired driving enforcement, and this fact underscores that police services are already taxed and unable to effectively enforce drug-impaired driving laws in conjunction with existing impaired driving laws at .08.

In addition, a growing proportion of drug-impaired driving cases resulted in a criminal charge in 2015 (59%) as compared to 2009 (53%), and more than one-quarter (28%) of police-reported drug-impaired driving incidents required more than 30 days to clear, compared to just 16% for impaired driving incidents involving alcohol (Perreault 2017).

The importance of the enforcement of drug-impaired driving laws is emphasized in light of fatal crash data from Canada as well as from jurisdictions that have opted to legalize marijuana, which has been proposed by the Federal Government.

A majority (82.9%) of fatally injured drivers were tested for drugs in Canada in 2014. Among those tested, 42.4% were positive for drugs according to TIRF's National Fatality Database (Brown et al. 2016; Robertson et al. 2017). Among these fatally injured drivers who were positive for drugs, 44.7% tested positive for cannabis.

Similarly, data from two of the prominent U.S. jurisdictions that have legalized cannabis have shown increases in the prevalence of impaired driving and in the number of fatal crashes involving the active ingredient of marijuana (THC). A report that summarized early findings from Colorado published in March 2016 reported that the prevalence of marijuana (either alone or in combination with other substances) in impaired driving offences increased from 12% to 15% between 2014 and 2015. In addition, fatal crashes involving the active ingredient THC increased 44% from 2013 to 2014 (Reed 2016). Equally concerning, in Washington, more than three-quarters (84.3%) of drivers who tested positive for cannabinoids were positive for THC in sharp comparison to the 44.4% of drivers who were positive in 2010. In addition, half of drivers in fatal crashes who were positive for THC had more than the 5ng/ml per se limit (Grondel 2016).

Distracted driving is a growing enforcement priority. It has been reported in several Canadian jurisdictions that deaths due to distracted driving have surpassed impaired driving (Robertson et al. 2017b; OPP 2016), suggesting that distracted driving enforcement is also insufficient. According to an environmental scan on this issue published by TIRF in 2015, 30% of respondents noted enforcement occurred on a monthly basis in their jurisdiction, whereas almost half (45%) of respondents indicated a



quarterly basis or bi-annual enforcement efforts. Data from key informant interviews indicated that agencies have attempted to enforce distracted driving laws as frequently as possible, however, competing road safety priorities have made it challenging to consistently allocate human resources and financial resources to this issue in the long-term. To illustrate, 35% of respondents to the environmental scan reported that enforcement resources were low or inadequate; 38% reported that resources were moderately available. A common concern that was noted among police agencies was that there are a number of road safety issues that require consistent enforcement and allocating human resources and financial resources to maintain consistent enforcement can be challenging (Robertson et al. 2015).

As further evidence of the magnitude of this problem, Alberta Transportation reported that there were 27,281 convictions for distracted driving from April 2015 to March 2016 (Alberta Transportation 2016); the Insurance Corporation of British Columbia reported that 54,600 tickets were issued in

BC in 2014 for email or texting violations or using an electronic device behind the wheel (CTV Vancouver 2015). More recently, in 2016 media reports revealed that in Fredericton distracted driving charges increased 48% between 2015 and 2016, and in Toronto charges increased 37% in the 1st quarter of 2017 compared to 2016.

As a consequence, distracted driving enforcement can and should be expected to grow in response to this development. Ultimately this means that enforcement resources from other areas will likely be re-allocated accordingly unless new resources become available.

In summary, the enforcement of impaired driving laws faces significant challenges across Canada. These challenges are variable, as illustrated, and are largely due to a shrinking police force, competing enforcement priorities, and increased concern about drug-impaired and distracted driving which has caused resources to be allocated to different concerns. These challenges, along with the decline in public interest in impaired driving, are significant concerns for public safety in Canada. Although the general decline in impaired driving that has already been noted is encouraging, such a decline should not give rise to the belief that the problem has been resolved. Rather, some impaired driving data suggest that although the number of alcohol-impaired drivers has declined, a core group of offenders with complex behavioural motivations remain persistent in their offending behaviour. This suggests that more and comprehensive enforcement strategies will be necessary to truly reduce the problem further.

Data show criminal courts are overwhelmed and impaired driving cases are resource-intensive.

Impaired driving offences are among the most common offences or cases heard in criminal courts in Canada (Maxwell 2015). It is estimated that the median length of time to complete these cases is slightly longer than other criminal cases, and alcohol-impaired driving cases required an average of five court

appearances (Perreault 2017). Data from TIRF's 2008 survey of lawyers revealed that, on average, 24% of the caseload of

Alcohol-impaired driving caseloads among Crown prosecutors were four times the size of the caseload for defence attorneys.

Crown prosecutors and defence attorneys was comprised of impaired driving cases. Of greater concern, this survey also demonstrated that Crown prosecutors had caseloads that were four times the size of the caseload of defence attorneys (Robertson et al. 2009).

As such, the existing pressures on courts and their inability to deal with the volume of criminal cases is not new and is well-documented, dating back to 1990 and the Askov decision which resulted in 47,000 charges being thrown out by judges in the following year (Fine 2017). More recently, the Senate Standing Committee on Legal and Constitutional Affairs reiterated the need to reduce court processing times (Senate Canada 2016); a need that was poignantly underscored by a July 2016 decision of the Supreme Court of Canada, known as *R. v. Jordan*.

R. v. Jordan was a landmark case in Canada because it directly impacted the definition of a "reasonable time" for criminal matters to be resolved in the Canadian criminal justice system. The case instituted strict timelines that criminal justice professionals must follow in order for the case to be considered by the courts. Specifically, for a provincial court the case must be resolved within 18 months from the initial charge. For superior courts, the case must be resolved within 30 months of the initial charge. If cases take longer than these timeframes, and the delay is not caused by very specific circumstances, then the delay is considered to be unreasonable. If the delay is considered unreasonable the charges against the accused will be stayed (*R. v. Jordan*).

The *Jordan* decision has stressed the gross disconnect between criminal justice system resources and court volume. In fact, this case has resulted in significant criminal matters, including murder and attempted murder, not being prosecuted. In some jurisdictions, such as Alberta, prosecutors withdrew 200 cases in two months to ensure that murder cases could be prosecuted, while in other jurisdictions such as Manitoba and Nova Scotia, Chief Justices discarded the practice of preliminary inquiries and "best-offer" plea agreements emerged as the new standard (Fine 2017). What is most concerning is that the consequences of *Jordan* are just beginning to emerge. It is clear that the pressure on the criminal justice system is unprecedented and inordinate.

This pressure can translate into several serious logistical issues for impaired driving cases in the courts. For example, whereas historically impaired driving cases could be prosecuted in approximately two hours in the early 1980s, today these cases require days and weeks of not only court time but preparatory time as well (Perreault 2017). Cases often cannot be completed in one day and adjournments are routine. Charter applications are also common and three days of evidence is average with a decision just on the Charter application taking at least two weeks. These accused are presumed innocent and there is a never-ending variety of Charter applications brought in these cases, including: breach of s. 10(b) of the Charter as a result of any delay whatsoever between the driver's arrest and the provision of the rights to counsel; breach of the driver's right to counsel of choice pursuant to s. 10(b) of the Charter due to the police failing to allow the driver to retrieve their cell phone to access the contact information for his 'counsel of choice', and at least four police officers as well as the accused are required to testify with regard to the alleged breaches. Other common allegations that rights were violated are made under ss. 7, 8, and 9 of Charter. These applications often mean that additional police officers who may have interacted with the accused are required to testify, for example, such as in the holding cells. In fact, these cases are frequently litigated over the accused's right to counsel and allegations of 'over holding', arguing that the accused was kept in police custody longer than necessary resulting in an arbitrary detention and breach of section 9 of the

Charter. In addition to allegations of Charter breaches, the accused may raise any number of evidentiary and procedural issues. Further, it is not uncommon for either convictions or rulings on Charter applications to be appealed. Appeals often set out multiple grounds (e.g., the trial judge erred in failing to exclude the results of the Intoxilyzer due to a breach of the appellant's right to privacy while he was consulting with counsel; the trial judge erred in failing to exclude the Intoxilyzer readings by reason of the over holding of the appellant in custody).

To add to these issues, drug-impaired driving cases represent a growing burden on criminal courts. Despite drug-impaired driving legislation being implemented in 2008, criminal justice practitioners are reportedly still struggling to effectively manage drug-impaired driving cases. In 2009, these cases represented just 2% of all impaired driving cases, and by 2015, this proportion had increased to 4%. Data suggest that the median time to complete drug-impaired driving cases (227 days) is exceptionally longer than the median time required for alcohol-impaired driving cases (121 days) in 2014/2015 (Perreault 2017). Of greater concern, just 61% of drug-impaired driving cases resulted in a guilty verdict, in contrast to a conviction rate of 81% for alcohol-impaired driving cases.

What these issues highlight is that there is a need to re-examine alternative strategies to criminal conviction. Specifically, it can be posited that at the current pace, impaired driving issues continue to be a major burden upon the criminal justice system. If this trend continues, one result might be the withdrawal of charges in order to prosecute other offences, as there is some evidence that this is already taking place (Fine 2017). This underscores the need to consider alternative strategies to criminal prosecution and more effective countermeasures. Otherwise, the workload may potentially become unmanageable, and erode deterrent effects that have been achieved.

Provincial/territorial administrative regimes and other evidence-based impaired driving countermeasures are integral features of Canada's impaired driving strategy and offer important benefits.

In light of the challenges that have been outlined above related to the processing of impaired driving charges within the criminal justice system, alternative avenues of enforcement and penalties are important to consider. Some of these alternatives, such as administrative regimes, have been widely utilized to reduce impaired driving and augment criminal justice strategies. In addition, the use of alcohol interlocks, remedial programs for impaired drivers, and cognitive behavioural interventions are available, but not consistently applied. These options require consideration as opportunities to further reduce impaired driving and are described below.

Administrative regimes for impaired driving between .05 and .08 BAC. Existing administrative regimes for .05 BAC level impaired driving incidents, which are unique to Canada, have evolved substantially in the past decade. Notably, there is evidence that they are effective in reducing the strain upon the criminal justice system. Currently, all provinces in Canada, with the exception of Québec, have implemented sanctions for drivers with a BAC of .05 to .08 (so-called "Warn Range") or even lower than .05 (CCSA 2016). While Quebec does not utilize a .05 regime, Crown prosecutors in Quebec are more likely to proceed with criminal charges at .08 BAC as compared to other jurisdictions in Canada (Robertson et al. 2009).

Generally, administrative penalties escalate in accordance with repeated incidents. First incidents typically include a monetary penalty combined with an immediate roadside short licence suspension of a few days. Second incidents typically escalate the consequences and may also require the completion of an alcohol education program. Consequences for third or subsequent incidents include more substantial penalties, longer periods of licence suspension measured in months, as well as an alcohol interlock requirement and an alcohol assessment or treatment program. In essence, administrative regimes work well to immediately remove drivers from the road and impose measures that protect the public. Some jurisdictions, such as Ontario, count incidents and apply escalating sanctions for repeat offences, thus helping to ensure better identification and treatment of the driver.

The consequences associated with .05 administrative regimes are also applied with swiftness and certainty which are essential components of deterrence. As evidence of this, an evaluation of the administrative penalties associated with the “warn range” program in Ontario showed significant reductions in the number of persons killed and injured in collisions involving a drinking driver (Byrne et al. 2016). The reductions associated with low-BAC laws have also been reported in other Canadian jurisdictions (Blais et al. 2015). As such, research shows that existing administrative regimes have achieved a substantial deterrent effect.

There has been much discussion about the benefits of reducing the legal BAC limit in Canada to .05 to further deter impaired driving offences in the past decade. Research evidence and key issues related to the potential outcomes of this proposal are briefly described below in order to facilitate informed decision-making. Perhaps of greatest importance, it warrants highlighting that much of the research regarding the effectiveness of .05 in reducing impaired driving has been studied in relation to criminal law in the absence of administrative regimes. For instance, an evaluation of the effectiveness of reducing the criminal BAC limit was conducted in Austria following the introduction of the law in 1998. The evaluation showed that injuries due to drunk driving declined 10% in the first year which represented a substantial positive effect. However, researchers underscored that “the accident reduction may be explained not only as a consequence of the legal alterations but also as a consequence of intensive support in the media, persistent police enforcement, and the introduction of mandatory psychological driver improvement courses for drunk drivers” (Bartl & Esberger 2000; p.1). Notably, the level of enforcement that produced these positive effects included a 25% increase in the number of alcohol breath tests in the first year after the law was introduced.



Conversely, an evaluation of the reduced BAC limit of .05 that was introduced in 1990 in New South Wales (Homel 1994) noted that while the average BAC of drink drivers, including among high-BAC drivers, declined, the effects of the law (which was introduced with low enforcement and media attention) were small and limited to Saturdays only; the effect was not visible in relation to other days of the week. In addition, it was suggested that the deterrent effect of the law “may not have been sustained if RBT had not been introduced two years later” (p.147). The study concludes that “The manner in which a .05 law would be enforced is critical, as well as the degree of public support for the lower limit” (p.154). These two very different evaluations provide insight into the importance of a robust implementation strategy to achieve a strong deterrent effect.

An important feature of the implementation of low-BAC laws in several countries is that they were quite frequently introduced with intensive, high visibility enforcement, mass media campaigns, and complementary measures such as RBT or driver interventions. These integral features of the implementation of laws would be challenging to achieve in Canada for reasons previously stated. In the event that any new legislative measures were enacted, they would have to be preceded by a large scale public awareness campaign to re-engage the public around this issue. These measures would also have to be sufficiently enforced by law enforcement to increase the real and perceived likelihood of detection which are necessary pre-requisites for a deterrent effect. In summary, in order to accrue public safety benefits of new impaired driving laws, they must be accompanied by road safety campaigns and increased enforcement. However, data included in this report provide insight into why this may be difficult to do in practice.

Another important feature of the evaluation of these laws is that most often the objective of these evaluations is focused on a simple reduction in the criminal BAC limit from .08 to .05. The basis for this type of action is deterrence theory, the general principle being that a greater punishment for an action will make it less likely that an individual will engage in that action (Zimring et al. 1973). For this reason, a common strategy across jurisdictions has been to increase the criminal penalties of an action when trying to achieve a deterrent effect. Although there is substantial evidence of the effectiveness of deterrence theory, its implementation is somewhat limited. For instance, although the creation of new criminal penalties, or the increase in punishment for pre-existing ones, may be undertaken with the intention to



deter individuals, the reality is these laws may eventually be violated. Therefore, new offenders may potentially be created, or previously lightly sanctioned offenders will become heavily sanctioned.

This can be concerning as there is substantial research which demonstrates that “over-servicing” or “over-penalizing” offenders who were previously not sanctioned so heavily

may actually be detrimental to changing their offending behaviour (Andrews & Bonta 2010; Gendreau and Goggin 1997; McGuire 2001; Brusman Lovins et al. 2007; Andrews et al. 1990; Lowenkamp & Latessa 2002; Lowenkamp et al. 2006). This process of “net-widening” of the criminal justice system may end up causing a greater burden on an already overburdened system without necessarily reducing recidivism. With these considerations in mind, the benefits of the administrative regime, which result in minimal impacts upon the criminal justice system, should be underscored.

Finally, the uniqueness of Canada’s administrative regime for impaired driving incidents between a .05 and .08 BAC is underscored since Canada’s existing practices mean that the results of .05 evaluations from other countries may not be directly transferable to the Canadian context. Whereas most evaluations of a .05 deterrent effect have occurred in jurisdictions where the reduction was from a .08 criminal limit to a .05 limit, such as those done in Australia and Europe, those evaluations have not examined this effect in a jurisdiction where a .05 administrative regime was already in place. Specifically, studies to evaluate the effects of this type of law have not been conducted in a jurisdiction where administrative BAC laws at .05 have been in place for more than two decades. Similarly, evaluations have not occurred in jurisdictions in which such administrative programs have been substantially enhanced with stronger penalties and tracking of offenders in recent years, and specific and general deterrent effects of these laws have already been demonstrated. In this regard, the context of Canada is quite unique.

Whether or not the introduction of a criminal .05 regime in Canada will achieve an additional deterrent effect remains unclear. In the face of growing concerns about the feasibility of processing impaired driving as a criminal justice issue, the current administrative regime offers an avenue whereby the least serious cases can be effectively resolved and the deterrent effect maintained. The extent to which these benefits can be sustained with the induction of a criminal .05 limit is unknown; and in light of the current state of the Canadian criminal justice system, a new criminal .05 regime may not effectively address the concerns of Canadians.

Aside from existing administrative regimes for low-BAC incidents, there are other efficient and cost-effective strategies to prevent and reduce impaired driving. These countermeasures are more widely used and studied, and warrant serious consideration as options to further reduce impaired driving. Alcohol interlocks and cognitive behavioural interventions have demonstrated the most success in changing the behaviour of the most persistent impaired drivers, and these strategies represent viable alternatives to achieve deterrence as well as protect the public.

Alcohol ignition interlocks. Current evidence shows that the consistent use of alcohol interlocks among impaired drivers reduces recidivism, reduces the average BAC of breath tests, reduces the number of failed tests over time and reduces fatal crashes (Vanlaar et al. 2013, 2017; Kaufmann & Wiebe 2016; Marques et al. 2010; McCartt et al. 2013; Lucas et al. 2016; McGinty et al. 2017; Teoh et al. 2018). A comprehensive evaluation of the ignition interlock program in Nova Scotia (Vanlaar et al. 2017), revealed a 90% reduction in recidivism among voluntary participants and 79% reduction after participants exited from the program (i.e., specific deterrence). In addition, with respect to general deterrence, there were temporary decreases in the numbers of alcohol-related charges (13.32%) and convictions (9.93%) (Vanlaar et al. 2017). This study also found a small significant permanent decrease in the number of fatal and serious injury alcohol-related crashes, following the implementation of the program in Nova Scotia.

An examination of behavioral patterns among interlock offenders was conducted as part of three separate studies (Vanlaar et al. 2010; 2013; 2016). Interlock offenders in the Netherlands, Florida, California, Texas and Nova Scotia were studied. Results of these studies showed that:

- > The average test BAC and number of failed tests declined over time.
- > Good monitoring was associated with higher levels of compliance while the device was installed.
- > Data also suggested that positive reinforcement is important, especially for those who are on the interlock for longer periods of time (>12 months).

Two U.S. studies of the effect of all offender (i.e., first and repeat impaired driving offences) interlock laws (Kaufman & Wiebe 2016; McGinty et al. 2016) investigated the impact of state ignition interlock laws on alcohol-involved crash deaths in the U.S. Studies revealed that requiring ignition interlocks for all drunk-driving convictions was associated with fewer alcohol-involved crash deaths, compared to states with less-stringent requirements.

Remedial programs and cognitive behavioural interventions (CBT). These interventions are a form of psychosocial therapy with an action-oriented perspective. CBT encompasses a wide range of cost-effective psychotherapeutic approaches that deal with cognitions and beliefs as a means to reducing problematic behaviours (Beck 1993). The objective of this approach is to identify thoughts, assumptions, beliefs, and behaviours that are related to negative emotions and underlying dysfunctional problems (e.g., drinking problems) and to replace these with more realistic and functional ones. Ultimately, the goal is to change an individual's thoughts in order to change their behaviour. A number of studies cited in a critical review of effective treatment interventions for impaired drivers by Robertson et al. (2014) support the effectiveness of CBT in treating alcohol abuse including:

- > Longabaugh et al. (1999) found that alcohol abusers who received CBT had better drinking-related outcomes than those who did not receive therapy.
- > More than 24 randomized control trials found CBT to be comparable to, or more effective, than other treatments for alcohol abuse (Carroll 1996).
- > Carroll (1996) also found that CBT was particularly effective in reducing the severity of relapse.
- > Offering offenders with a high level of alcohol dependence extensive treatment such as CBT has been shown to be highly cost-effective (Holder et al. 2000; Berglund et al. 2003).

According to this review, there has also been some more recent research that demonstrates the effectiveness of combining CBT with motivational interviewing (MI) (see Timken et al. 2012). However, it should be noted that, although CBT is one of the most studied substance abuse treatment interventions, research investigating the effectiveness of CBT in reducing impaired driving recidivism is limited and only a small number of studies have specifically and rigorously tested the effectiveness of CBT, or variations of it, in reducing either alcohol misuse or impaired driving behaviour among this offender population (Brown & Ouimet 2013).

In summary, it is essential to recognize the context and conditions under which these impaired driving laws achieve positive outcomes, to help ensure that the benefits of these measures are realized in the Canadian context. Additionally, the use of alcohol ignition interlocks, remedial programs, and CBT have clearly demonstrated positive benefits for public safety and are currently underused. These measures underscore that, although the situation facing the criminal justice system is daunting, there are comprehensive strategies that can be applied to achieve further reductions in impaired driving without jeopardizing public safety.



CONCLUSIONS

There have been substantial and continued declines in impaired driving across Canada over the past decade. Canadians are better protected from impaired drivers and fewer lives are lost. However, the death toll remains unacceptable and Canadians should not be complacent. Declines in public awareness in conjunction with significant challenges facing law enforcement are cause for concern. As demonstrated, both awareness and enforcement are needed in order to ensure that impaired driving reductions continue to be achieved. Road safety campaigns are essential to re-engage the public on impaired driving issues, and new approaches may be warranted if current levels of awareness do not increase. Likewise, police are currently facing several competing road safety priorities without further support or resources. This is a cause for concern as there is evidence this has negatively affected the level of impaired driving enforcement. These issues are further compounded by the current challenges faced by the criminal justice system when processing impaired driving cases. With increased demands for efficiency due to the *R. v. Jordan* decision, this could cause an unprecedented burden to be placed upon the criminal justice system that may result in impaired driving cases being stayed.

These three issues, declining public awareness, enforcement challenges, and renewed pressure on the criminal justice system represent major risks to public safety. These issues combined could lead to a potential increase in impaired driving and erode gains that have been previously achieved and hard won. This is particularly concerning in light of the legalization of cannabis, which is anticipated to produce increases in impaired driving based on experiences from other jurisdictions.

However, despite these concerns, there are solutions available which have had reported success in helping to manage issues of impaired driving. For example, administrative regimes have been effectively implemented across Canada and can be used as an alternative to formal criminal charges against impaired drivers. This could effectively relieve the criminal justice system of significant burden, while still maintaining a deterrent effect to the general population. Additionally, alternative approaches, such as ignition interlocks and offender rehabilitation, represent comprehensive long-term strategies with promising potential to further reduce the risk of impaired driving on Canadian roadways.

REFERENCES

- Andrews, D., & Bonta, J. (2010). Rehabbing criminal justice policy and practice. *Psychology, Public Policy, and Law*, 16(1), 39-55.
- Andrews, D., Zinger, I., Hoge, R., Bonta, J., Gendreau, P., & Cullen, F. (1990). Does correctional treatment work? A clinically relevant and psychologically informed meta-analysis. *Criminology*, 28(3), 369-404.
- Bartl, G. & Esberger, R. (2000). Effects of lowering the legal BAC limit in Austria. In: Laurell, H; Schlyter, F., editors. *Proceedings of the 15th International Conference on Alcohol, Drugs and Traffic Safety. – T'2000; International Council on Alcohol, Drugs and Traffic Safety (ICADTS); 22-26 May 2000. Stockholm, Sweden.*
- Beck, A. (1993). *Cognitive Therapy and the Emotional Disorders*. NY: Penguin.
- Berglund, M., Thelander, S., Salaspuro, M., Franck, J., Andreasson, S., & Ojehagen, A. (2003). Treatment of alcohol abuse: An evidence-based review. *Alcoholism: Clinical and Experimental Research*, 27(10), 1645-1656.
- Blais, E., Bellavance, F., Marcil, A., and Carnis, L. 2015. Effects of introducing an administrative 05% blood alcohol concentration limit on law enforcement patterns and alcohol-related collisions in Canada. *Accident Analysis & Prevention* 82, 101-111.
- Brown, S. W., Vanlaar, W. G. M., & Robertson, R. D. (2017). *The Alcohol and Drug-Crash problem in Canada 2014 Report*. CCMTA Road Safety Research Report Series. Prepared by Traffic Injury Research Foundation of Canada. Ottawa: Canadian Council of Motor Transport Administrators.
- Brown, S.W., Mainegra Hing, M., Vanlaar, W.G.M., & Robertson, R.D. (2017). *Road Safety Monitor 2017: Drinking & Driving in Canada*. Traffic Injury Research Foundation. Ottawa, Canada
- Brown, T.G., & Ouimet, M. (2013). Treatments for alcohol-related impaired driving. In M. McMurrin (Ed.), *Alcohol-Related Violence: Prevention and Treatment* (pp.303-334). Mississauga: John Wiley & Sons, Ltd.
- Brusman Lovins, L., Lowenkamp, C., Latessa, E., & Smith, P. (2007). Application of the risk principle to female offenders. *Journal of Contemporary Criminal Justice*, 23(4), 383-398.
- Byrne, P., Ma, T., Mann, R.E. and Elzohairy, Y. (2016). Evaluation of the general deterrence capacity of recently implemented (2009-2010) low and zero BAC requirements for drivers in Ontario. *Accident Analysis and Prevention* 88, 56-67.
- Canada. Parliament. House of Commons. *An Act respecting cannabis and to amend the Controlled Drugs and Substances Act, the Criminal Code and other Acts*. Bill C-45, 42nd Parliament, 1st Session, 2017. Ottawa: Public Works and Government Services Canada – First Reading, April 13th 2017.
- Canada. Parliament. House of Commons. *An Act to amend the Criminal Code (offences relating to conveyances) and to make consequential amendments to other Acts*. Bill C-46, 42nd Parliament, 1st Session, 2017. Ottawa: Public Works and Government Services Canada – First Reading, April 13th 2017.
- Canadian Centre on Substance Abuse, 2016. *Short-term administrative sanctions for alcohol and drug use by drivers*. Retrieved August 2nd, 2017, from: <http://www.ccsa.ca/Resource%20Library/CCSA-Administrative-Sanctions-Impaired-Driving-Policy-Brief-2016-en.pdf>
- Carroll, K. (1996). Relapse prevention as a psychosocial approach: A review of controlled clinical trials. *Experimental Clinical Psychopharmacology*, 4, 46-54.
- CTV Vancouver (February 2015). *Increased infractions not deterring distracted drivers*. Video published on Friday February 27, 2015 3:21pm PST. Retrieved October 2015, bc.ctvnews.ca/increased-infractions-notdeterring-distracted-drivers-1.2257486
- Fell, J., Lacey, J., & Voas, R. (2004). Sobriety checkpoints: Evidence of effectiveness is strong, but use is limited. *Traffic Injury Prevention*, 5(3), 220-227.

- Fine, S. (June 8, 2017). Courts shaken by search for solutions to delays. *Globe and Mail*.
- Gendreau, P. and Goggin, C. (1997). *Correctional treatment: Accomplishments and Realities*. Correctional Counseling and Rehabilitation. P. V. Voorhis, M. Braswell and D. Lester, Cincinnati, Anderson.
- Greenland, J. & Alam, S. (2017). *Police Resources in Canada, 2016*. Juristat. Canadian Centre on Justice Statistics. Statistics Canada Catalogue no. 85-002-X. ISSN 1209-6393.
- Grondel, D.T. (2016). *Driver Toxicology Testing and the Involvement of Marijuana in Fatal Crashes, 2010-2014: A Descriptive Report*. Washington Traffic Safety Commission.
- Henstridge, J., Homel, R., Mackay, P. (1997). *The Long-Term Effects of Random Breath Testing in Four Australian States: A Time Series Analysis*. Canberra, Department of Transport and Regional Development.
- Holder, H., Cisler, R., Longabaugh, R., Stout, R., Treno, A., & Zweben, A. (2000). Alcoholism treatment and medical care costs from Project MATCH. *Addiction*, 95, 999-1013.
- Homel, R. (1994). Drink-driving law enforcement and the legal blood alcohol limit in New South Wales. *Accident Analysis and Prevention* 26(2): p.147-155.
- Kaufmann, E.J. & Wiebe, D.J. (2016). Impact of State Ignition Interlock Laws on Alcohol-Involved Crash Deaths in the United States. *Research and Practice*. American Journal of Public Health. Published online ahead of print March 17, 2016.
- Lapham, S.C., Skipper, B.J., Hunt, W.C., & Chang, I. (2000). Do risk factors for rearrest differ from female and male drunk-driving offenders? *Alcoholism: Clinical and Experimental Research*, 24(11), 1647-1655.
- Longabaugh, R., & Morgenstern, J. (1999). Cognitive-behavioural coping-skills therapy for alcohol dependence. *Alcohol Research and Health*, 23, 78-85.
- Lowenkamp, C., & Latessa, E. (2002). *Evaluation of Ohio's community based correctional facilities and halfway house programs*. Unpublished manuscript, University of Cincinnati, Division of Criminal Justice.
- Lowenkamp, C., Latessa, E., & Holsinger, A. (2006). The risk principle in action: What have we learned from 13,676 offenders and 97 correctional programs? *Crime & Delinquency*, 51(1), 1-17.
- Lucas, J.M, Casanova-Powell, T.D., Le, T., Scopatz, R. (2016). *Minnesota Ignition Interlock Program Evaluation-Final Report*. Minnesota Office of Traffic Safety.
- Marques, P.R., Voas, R.B., Roth, R., and Tippetts, S.A. (2010). *Evaluation of the New Mexico Ignition Interlock Program*. Report No. DOT HS 811 410. Washington, D.C.: National Highway Traffic Safety Administration.
- Maxwell, A. (2015). "Adult criminal court statistics in Canada, 2013/2014." *Juristat*. Vol. 35, no. 1. Statistics Canada Catalogue no. 85-002-X.
- McCartt, A., Leaf, W.A., Farmer, C.M., and Eichelberger, A.H. (2013). Washington State's Alcohol Ignition Interlock Law: Effects on Recidivism Among First-Time DUI Offenders. *Traffic Injury Prevention*, 14:3, 215-229. <http://dx.doi.org/10.1080/15389588.2012.708885>.
- McGinty, E. E., Tung G., Shulman-Laniel J., Hardy R., Rutkow L., Frattaroli S., and Vernick J.S. (2017) Ignition Interlock Laws: Effects on Fatal Motor Vehicle Crashes, 1982–2013. *American Journal of Preventive Medicine*, 52(4):417-423. <https://doi.org/10.1016/j.amepre.2016.10.043>
- McGuire, J. (2001). "What works in correctional interventions? Evidence and practical implications." In G. Bernfeld and A. Leschied (eds.) *Offender Rehabilitation in Practice: Implementing and Evaluating Effective Programs*. (p. 25-43). New York: John Wiley & Sons Ltd.
- National Highway Traffic Safety Administration (NHTSA). (2009). *Alcohol-Impaired Drivers Involved in Fatal Crashes, by Gender and State, 2007-2008*. Traffic Safety Facts 2009. DOT HS 811 095. Washington, D.C.: U.S. Department of Transportation.

- Ontario Provincial Police (OPP) (August 29, 2016). Inattentive Drivers Linked to Twice as Many Road Deaths as Impaired Drivers this Year. OPP to Conduct Distracted Driving Campaign over Labour Day Weekend. opp.ca/News
- Perreault, S. (2013). Impaired Driving in Canada, 2011. Juristat (Catalogue no. 85-002-X). Ottawa: Statistics Canada.
- Perreault, S. (2016). Impaired driving in Canada, 2015. Juristat: Canadian Centre for Justice Statistics, 1.
- Perreault, S. (2017). Impaired Driving in Canada, 2016. Juristat. Canadian Centre on Justice Statistics. Statistics Canada Catalogue no. 85-002-X. ISSN 1209-6393
- R. v. Jordan, 2016 SCC 27, [2016] 1 S.C.R. 631
- Reed, J.K. (2016). Marijuana Legalization in Colorado: Early Findings. A Report Pursuant to Senate Bill 13-283. Colorado Department of Public Safety. Division of Criminal Justice. Office of Research and Statistics.
- Robertson, R. D., Holmes, E., & Marcoux, K. (2013). Female Drunk Drivers: A Qualitative Study. Traffic Injury Research Foundation. Ottawa, Canada.
- Robertson, R.D, Mainegra Hing, M., Pashley, C., Brown, S.W. & Vanlaar, W.G.M. (2017). Prevalence and trends of drugged driving in Canada. Accident Analysis and Prevention 99 : p.236-241.
- Robertson, R.D. and Wood, K. & Holmes, E.A. (2014). Impaired Driving Risk Assessment: A Primer for Practitioners. Traffic Injury Research Foundation. Ottawa, Canada.
- Robertson, R.D., Bowman, K., & Brown, S.W. (2017). Distracted Driving: A National Action Plan. Traffic Injury Research Foundation. Ottawa, Canada.
- Robertson, R.D., Bowman, K., Charles, J.M. (2015). Distracted Driving in Canada: Making Progress, Taking Action. Ottawa, Ontario: Traffic Injury Research Foundation.
- Robertson, R.D., Vanlaar, W.G.M, Simpson, H. & Boase, P. (2009). Results from a national survey of Crown prosecutors and defence counsel on impaired driving in Canada: A "Systems Improvements" perspective. Journal of Safety Research 40, 25-31.
- Robertson, R.D., Woods-Fry, H. & Morris, K. (2016). Cannabis & Road Safety: Policy Challenges. Traffic Injury Research Foundation. Ottawa, Canada.
- Senate Canada. 2016. "Delaying justice is denying justice. An urgent need to address lengthy court delays in Canada." Report of the Standing Senate Committee on Legal and Constitutional Affairs. (accessed August 12, 2016).
- Teoh, E., Fell, J., Scherer, M., and Wolfe, D.E.R. (2018). State alcohol ignition interlock laws and fatal crashes. Insurance Institute for Highway Safety, March 2018. <http://www.iihs.org/frontend/iihs/documents/masterfiledocs.ashx?id=2156>
- Timken, D.S., Nandi, A., & Marques, P. (2012). Interlock Enhancement Counseling: Enhancing Motivation for Responsible Driving: A Provider's Guide. Centre for Impaired Driving Research and Evaluation.
- Traffic Injury Research Foundation (2017) Marijuana Use Among Drivers in Canada, 2000-2014. Ottawa, Ontario: Traffic Injury Research Foundation.
- Vanlaar, W.G.M, Hing, M. M., Brown, S., McAteer, H., Crain, J., & McFaull, S. (2016). Fatal and serious injuries related to vulnerable road users in Canada. Journal of Safety Research, 58, 67-77.
- Vanlaar, W.G.M, Mainegar Hing, M. & Robertson, R.D. (2017). An evaluation of Nova Scotia's alcohol ignition interlock program. Accident Analysis and Prevention. 100 : p.44-52.
- Vanlaar, W.G.M., McKiernan & Robertson, R.D. (2013). Behavioral Patterns of Interlocked Offenders: Phase II. Traffic Injury Research Foundation. Ottawa, Canada.
- Vanlaar, W.G.M., Robertson, R.D., Marcoux, K., Mayhew, D., Brown, S.W. & Boase P. (2012). Trends in alcohol-impaired driving in Canada. Accident Analysis and Prevention. 48 (1): 297-302.

Vanlaar, W.G.M, Robertson, R., Schaap, D., Vissers, J. (2010). Understanding Behavioral Patterns of Interlocked Offenders to Inform the Efficient and Effective Implementation of Interlock Programs: How Offenders on an Interlock Learn to Comply. Traffic Injury Research Foundation, Ottawa

Zimring, F. E., Hawkins, G., & Vorenberg, J. (1973). Deterrence: The legal threat in crime control. Chicago: University of Chicago Press.



Traffic Injury Research Foundation (TIRF)

171 Nepean Street, Suite 200

Ottawa, Ontario

Canada K2P 0B4

www.tirf.ca

Toll Free: 1-877-238-5235

Fax: 613-238-5292

Registered Charity No. 10813 5641 RR0001