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Assessment of the Initial Impact of Mandatory Alcohol Screening on Alcohol-involved Driver Fatalities in Canada

Final Report

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Background

Mandatory Alcohol Screening (MAS) became law in Canada on December 18, 2018. This amendment to the *Criminal Code* allowed police to demand a breath test of any driver even in the absence of suspicion or cause.

MAS introduced a fundamental change in the approach used by police officers to enforce alcohol-impaired driving laws in Canada. Prior to the introduction of MAS, a police officer could demand that a driver provide a breath sample only if they had reasonable grounds to suspect that the driver had alcohol in their body. Although the threshold for suspicion is not high (the odour of alcohol on a driver's breath or an admission of drinking is usually sufficient), these are not necessarily the most reliable clues. Police officers vary considerably in their ability to detect the signs and symptoms of alcohol use. Several studies have demonstrated that using typical clues to identify potential drinking drivers (such as the odour of alcohol, bloodshot and/or glassy eyes) can be challenging and can result in many drinking drivers going undetected (Compton, 1985; Wells et al., 1995).

The switch from the use of sensory and observational techniques to detect the use of alcohol to a technological approach (i.e., the use of an Approved Screening Device or ASD) to screen drivers for the presence of alcohol was intended to enhance the probability that drinking drivers would be detected and serve to reduce alcohol-related crashes. Research in other countries has demonstrated that when used as part of a comprehensive program that includes intensive and highly visible alcohol checkpoints along with public awareness, MAS serves to enhance general deterrence. It does so by increasing both the perceived and actual probability that drinking drivers will be detected, and by reducing alcohol-involved road crashes (Henstridge et al., 1997; Homel et al., 1995; Ross, 1984).

The objective of this project was to provide an indication of the initial impact of MAS by examining data on alcohol-involved driver fatalities, along with other key indicators of impaired driving before and after the introduction of MAS in Canada. It is expected that a reduction in the indicators of impaired driving would be consistent with a general deterrent impact of MAS.

Approach

The primary source of data for this project was information on fatally injured drivers obtained from provincial motor vehicle crash files. Jurisdictional motor vehicle departments compile information from police and coroner reports on the use of alcohol and/or drugs by drivers fatally injured in crashes. A request for these data was sent to the provincial/territorial representatives on the Road Safety Research and Policies (RSRP) committee of the Canadian Council of Motor Transport Administrators (CCMTA). A brief presentation to the RSRP committee at their semi-annual meeting in November 2020 followed, providing more information about the request and an opportunity to solicit and respond to questions.[1] Jurisdictions were asked to provide data on alcohol use by drivers fatally injured in crashes for the years 2016 through 2019. This would provide three years of data before, and one year of data following the introduction of MAS. It is acknowledged that the use of only a single year of data following the introduction of MAS is not sufficient to provide conclusive evidence about the overall impact of MAS. At best, the available data provides an indication of the direction and magnitude of change in drinking driver fatalities in the first year following the introduction of MAS.

[1] The assistance of Christine Legrand of CCMTA and Paul Boase from Transport Canada in facilitating this process is gratefully acknowledged.

Seven provinces agreed to contribute data for this research. These were British Columbia, Alberta, Saskatchewan, Manitoba, Ontario[2], Quebec and Nova Scotia. In some cases, formal research agreements were required before the data could be released.

Jurisdictions provided data in the format in which they were collected and stored. Hence, the type and amount of information in the dataset varied considerably across jurisdictions and was not always comparable. For example, some jurisdictions reported alcohol involvement among "drivers involved in fatal crashes" whereas others provided information on fatally injured drivers. In most cases, complete toxicology data were not available. However, alcohol (and in some cases, drug) involvement was recorded. Only fatally injured drivers of highway vehicles were included. Drivers of snowmobiles, dirt bikes, ATVs, boats, and other vehicles not intended for highway use were excluded.[3] However, it should be noted that the data provided by the provinces is considered preliminary and may be subject to revision as case reports are updated and finalized.

To supplement the data on driver fatalities, annual data on impaired driving incidents collected by Statistics Canada from police services through the Uniform Crime Reporting Survey (UCR) Survey were also examined. These data form a part of the "police-reported" crime statistics that are published annually (Moreau, 2019; Moreau et al., 2020) and provide a means to assess whether there was a change in the number of police-reported impaired driving incidents following the introduction of MAS.

In addition, several police agencies across Canada have been recording data on their implementation of MAS. As an illustration of the initial impact of the implementation of MAS by police, data from the Edmonton Police Service were obtained and are presented.

Results

Fatally Injured Drivers

The primary question addressed in this study concerned the extent to which the number and proportion of alcohol-impaired driver fatalities changed in the period following the introduction of MAS in Canada. Five provinces with comparable data elements—British Columbia, Alberta, Saskatchewan, Ontario, and Quebec—were included in this analysis. Alcohol-impaired drivers included those with a blood alcohol concentration (BAC) over 80 mg/dL, as well as those deemed impaired by alcohol by the investigating police officer.

Figure 1 presents the number of alcohol impaired and non-impaired driver fatalities for each year from 2016 through 2019[4]. In the three years prior to the introduction of MAS, the annual number of non-impaired driver fatalities showed little change. Over the same three-year period, the number of impaired driver fatalities varied between 163 and 182.

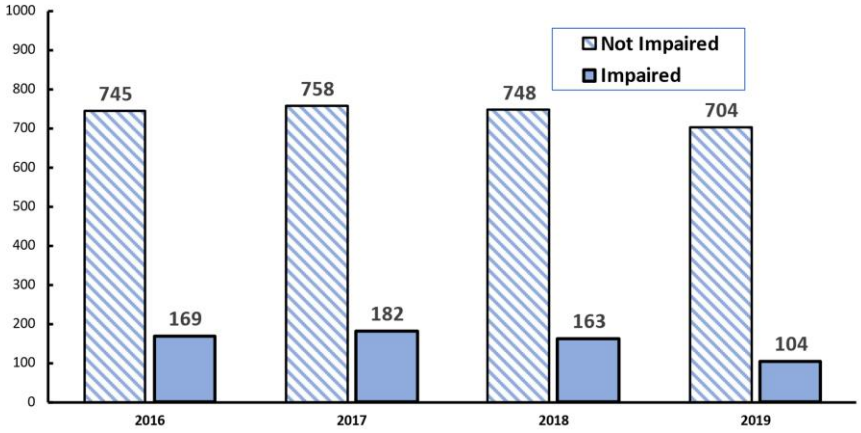
In 2019, the number of non-impaired driver fatalities (704) was lower than in the previous three years. The number of impaired driver fatalities also decreased to a level considerably below that in the previous three years (104).

[2] Ontario data were provided by the Ontario Centre of Forensic Sciences.

[3] While it is recognized that the impaired driving sections of the *Criminal Code* apply to operators of off-road vehicles, not all fatalities involving these types of vehicles are recorded.

[4] For the purposes of this analysis, driver fatalities that occurred in 2018 after the introduction of MAS on December 18 were subtracted from the 2018 total and added to the cases reported in 2019. Of the 23 cases that occurred in this two-week period in 2018 following the introduction of MAS, six were deemed impaired by alcohol.

Figure 1: Number of Fatally Injured Drivers According to Alcohol Impairment (5 Provinces)



To compare fatalities in the pre- and post-MAS periods, Table 1 presents the average number of alcohol impaired and non-impaired driver fatalities in the three years prior to MAS, the number of impaired and non-impaired driver fatalities in the first year following the introduction of MAS, as well as the percentage of fatalities that were deemed impaired in each period. In the three years prior to the implementation of MAS (2016–2018), there was an average of 750 driver fatalities per year who were not deemed impaired by alcohol. In the period following the introduction of MAS, there were 704 non-impaired driver fatalities—a decrease of 6.1%.

In the three-year period prior to MAS, there was an annual average of 171 impaired driver fatalities. Following the introduction of MAS, there were 104 impaired driver fatalities—a decrease of 39% from the average of the previous three years. This decrease is significantly greater than the 6.1% reduction among non-impaired driver fatalities ($z=3.11$, $p<.01$)[5].

Table 1 also shows that the percentage of all driver fatalities that were alcohol-involved was lower in 2019 than during the previous three years, prior to the introduction of MAS (12.9% in 2019 compared to 18.6%) ($z=11.8$, $p<.001$).

Table 1: Average Number of Alcohol Impaired and Non-impaired Fatally Injured Drivers in the Three Years Prior to MAS and Comparable Numbers in First Year after MAS

	Non-Impaired	Impaired	Percent Impaired
Pre: 2016-2018 (Mean)	750	171	18.6%
Post: 2019	704	104	12.9%
Percent Change Pre-Post	-6.1%	-39.3%	

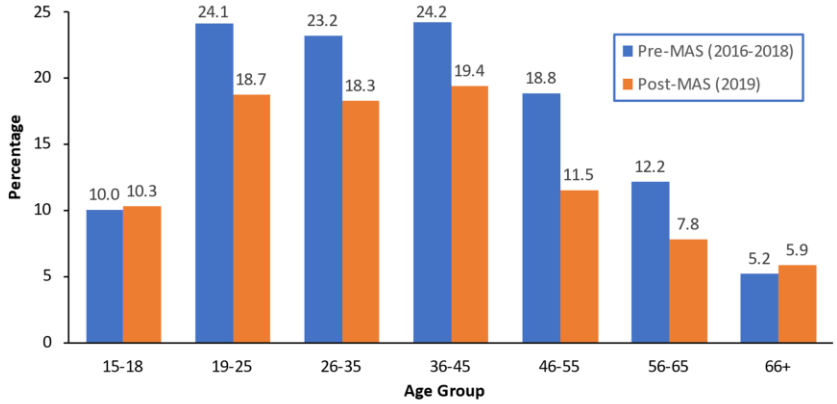
To determine if the decrease in alcohol-involved driver fatalities was related to driver characteristics, the age and sex distributions of driver fatalities were examined in the periods

[5] A p-value less than .05 is generally interpreted as being statistically significant; the probability of the result occurring by chance is less than 5 in 100.

before and after the introduction of MAS. In the three-year period prior to MAS, males comprised 82.1% of alcohol-involved driver fatalities. In the year following the introduction of MAS, the proportion of males did not change (81.5%; z=0.1, p>0.9).

Figure 2 presents the percentage of alcohol-impaired driver fatalities in the pre- and post-MAS periods according to age group. With the exception of those in the youngest (i.e., 15-19 years) and oldest (i.e., 66+ years) age groups, there was a lower percentage of fatally injured drivers who were impaired by alcohol following the introduction of MAS across the spectrum of age.

Figure 2: Percentage of Impaired Driver Fatalities Before and After the Introduction of MAS According to Age Group



Random roadside breath-testing surveys have repeatedly shown that impaired driving is most common on weekends (Beirness, 2019). Not surprisingly, alcohol-related fatalities are also most common on weekends (e.g., Beirness et al., 2021). Police enforcement of impaired driving often occurs on weekend nights at times when drinking drivers are most likely to be on the road. It is possible that the introduction of MAS might prompt potential drinking drivers to avoid these high-risk times. Therefore, the data on fatally injured drinking drivers were examined to assess the initial deterrent effects of MAS by examining the incidence of alcohol-involved driver fatalities on weekends (i.e., Saturday and Sunday). Using the data from five provinces, it was determined that prior to the implementation of MAS, 44.5% of drinking driver fatalities occurred on Saturday or Sunday. Following the implementation of MAS, a significantly lower percentage (32.6%) of alcohol-involved driver fatalities occurred on weekends (z=2.07, p<.05). This finding is consistent with a general deterrent effect of MAS.

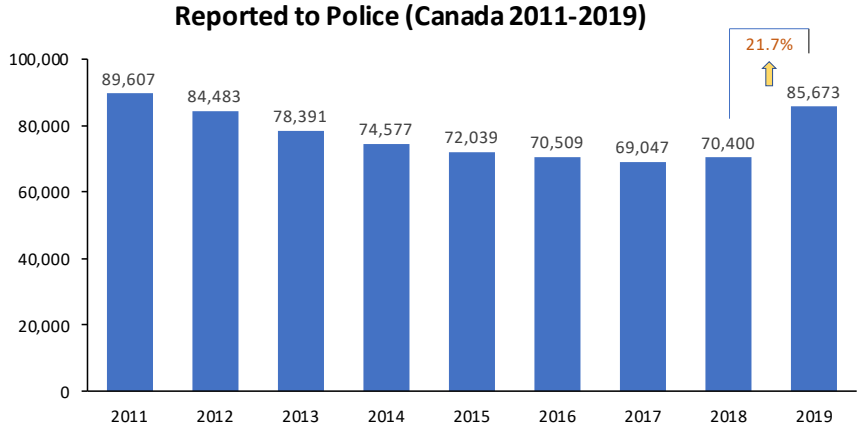
Impaired Driving Incidents

Although the objective of MAS is to reduce the overall prevalence of alcohol-impaired driving, in the initial stages of its implementation, before it becomes well known to drivers, it might be expected that more drinking drivers would be detected.

Annual data from the Uniform Crime Reporting Survey on police-reported impaired driving incidents were used to examine the initial impact of MAS on impaired driving incidents (Moreau, 2019; Moreau et al., 2020). Figure 3 presents the number of police-reported impaired driving incidents in Canada from 2011 through 2019. The figure shows a steady downward trend in the number of impaired driving incidents from 2011 to 2018, followed by a sharp increase (21.7%) in

2019.[6] There is no particular reason to suspect that the overall prevalence of impaired driving behaviour had increased substantially in the population in 2019. A reasonable hypothesis to account for this increase is that, through the use of MAS, police enforcement became more effective at identifying drinking drivers who might otherwise have gone undetected.

Figure 3: Number of Impaired Driving Incidents Reported to Police (Canada 2011-2019)



MAS Enforcement

Data on police alcohol checkpoints (known as Checkstop in Alberta) were obtained from the Edmonton Police Service for the years 2014 through 2019 and are presented in Table 2. Beginning December 21, 2018, officers were instructed to use Mandatory Alcohol Screening (MAS) during every officer-driver interaction. These data provide the opportunity to assess the initial effects of MAS and to help understand the effects of the change from suspicion-based alcohol screening of drivers to mandatory alcohol screening.

Table 3 provides a comparison of the data from Checkstops during the three-year period prior to the introduction of MAS with the one-year period following. The data from 2018 and 2019 have been adjusted to account for the five Checkstop operations conducted in 2018 after the introduction of MAS.[7] The shaded columns in Table 3 present the comparisons that have been made between the pre- and post-MAS periods. The first shaded column shows the number of Approved Screening Device (ASD) tests administered as a percentage of all vehicles checked (ASD/Vehicles Checked). During the pre-MAS period when suspicion-based alcohol screening was employed, officers administered ASD tests to 11.6% of drivers. Following the introduction of MAS, this increased to 99.2%. This clearly indicates that MAS was successful in testing virtually every driver stopped.

[6] Drug-impaired driving incidents accounted for 2,009 of the additional 15,273 incidents reported in 2019.

[7] This adjustment was done by computing the average number of events (e.g., number of vehicles checked, number of impaired arrests) per Checkstop operation in 2019 and multiplying this average by five (i.e., the number of Checkstop operations using MAS conducted in 2018). The result was subtracted from the 2018 data and added to post-MAS series. For example, in 2019, there were 182 impaired driving arrests in 35 Checkstop operations – an average of 5.2. Using this average, it would be expected that the five Checkstop operations using MAS conducted in 2018 would have resulted in 26 impaired driving arrests (5.2 x 5). These 26 arrests were subtracted from the 2018 data and added to the post-MAS data. The same process was used to adjust the other indicators in the table as well.

Table 2: Data from Edmonton Police Service Checkstop Operations (2014 - 2019)*

Year	Number of Operations	Impaired Arrests	Immediate Roadside Suspensions	Graduated Driver Licence Suspensions	Suspended Drivers Arrested	Total Vehicles Checked	Total ASD Tests
2014	31	174	77	71	21	8980	1116
2015	30	153	102	79	21	9112	1096
2016	32	149	88	91	20	9720	1010
2017	34	127	81	82	29	9844	1035
2018	35	149	71	107	32	10728	2676
2019	35	182	125	157	32	10519	10429

*Data provided by Detective Robert Davis are used with permission.

Table 3: Comparison of pre-MAS Checkstop Statistics with those following the Introduction of MAS

Period	Number of Operations	Total Vehicles Checked	Total ASD tests	ASD/ Vehicles Checked	Impaired Arrests	ImmediateRoadside Suspensions	Graduated Driver Licence Suspensions	Total Enforcement Actions Taken	Enforcement Actions/ Vehicles Checked	Enforcement Actions/ Checkstop Operation	Suspended Drivers Arrested	Suspended Arrests/ Total Vehicles Checked
Pre-MAS	157	46882	5443	11.61%	726	401	408	1535	3.27%	9.78	120	0.26%
MAS	40	12021	11919	99.15%	208	143	179	530	4.41%	13.25	35	0.29%

Although not shown in the table, it is easily demonstrated that the number of vehicles checked per Checkstop operation did not differ between the pre-MAS and post-MAS periods (298.6 vs 300.5). Assuming the duration of a Checkstop operation did not change, this latter finding suggests that screening virtually every driver for alcohol with an Approved Screening Device is a quick and efficient procedure that does not adversely affect the number of vehicles checked. In fact, in cases where the driver was not detained, the average time required for a MAS stop, including an ASD test, was 95 seconds. The shortest time required was 30 seconds.

The second shaded column in Table 3 presents the total of the number of drivers who were subject to enforcement action as a consequence of having tested positive for alcohol. This is the sum of "Impaired Arrests," "Immediate Roadside Suspensions (IRS)" and "Graduated Driver Licence (GDL) suspensions."[8] The next two shaded columns present different ways to view the changes in the number of enforcement actions from pre-MAS to post-MAS periods. The first presents the number of enforcement actions as a percentage of vehicles checked; the second presents the number of enforcement actions per Checkstop operation. Both indicators show an increase in enforcement actions of about 33% in the period following the introduction of MAS. This illustrates that MAS is considerably more efficient in detecting drinking drivers than suspicion-based screening.

The final two columns in Table 3 show the number and percentage of suspended drivers arrested during Checkstop operations. There is no particular reason to suspect that the number of suspended drivers identified at Checkstops would be affected by MAS. The data did, in fact, show no change in the percentage of suspended drivers arrested.

The data presented in Table 3 can also be used to show that if the rate of detection of drinking drivers during the post-MAS period had not increased but remained at the same level as during suspicion-based Checkstop operations, 143 drinking drivers would likely have escaped detection. Conversely, if mandatory alcohol screening had been in operation during the pre-MAS period, the enhanced rate of detection could have identified an estimated 532 additional drinking drivers who would have been subject to enforcement action.

Given that there is no reason to believe that there was a sudden increase in the rate of impaired driving in the population, the enforcement data from Edmonton illustrate the increased efficiency and effectiveness associated with MAS in detecting drivers who have been drinking. As the population becomes increasingly aware of both the enhanced probability of being screened for the presence of alcohol and the increased certainty of being detected and sanctioned if they have exceeded the alcohol limit, it would be expected that the overall rate of impaired driving will begin to decrease.

Discussion

Mandatory Alcohol Screening was introduced in Canada to reduce the number of deaths and injuries caused by impaired driving. By providing police officers with the means and authority to screen large numbers of drivers for the presence of alcohol, MAS enhances both the perceived and actual probability that drivers who have been drinking will be detected and subject to

[8] In Alberta, an Immediate Roadside Suspension (IRS) is a three-day licence suspension for driving with a BAC (blood alcohol concentration) over 50 mg/dL that is issued at the time of the violation. A Graduated Driver Licence suspension is a 30-day licence suspension issued to novice drivers in the Graduated Driver Licence program who are found driving with any amount of alcohol or drug in their body at the time of the violation. (These programs were subsequently modified on December 1, 2020.)

sanctions, key factors in creating and maintaining a high level of general deterrence. The primary purpose of this project was to provide a preliminary investigation of the impact of Mandatory Alcohol Screening in Canada by examining data on alcohol-involved driver fatalities. This was supplemented with data on police-reported impaired driving incidents and MAS enforcement data from Edmonton.

Data on driver fatalities in the three years prior to the introduction of MAS collected from five provinces were used to assess the extent of the initial impact of MAS on alcohol-impaired driver fatalities. In the first year following the introduction of MAS, alcohol-involved fatalities were 39% lower than the average of the previous three years. There was no differential effect on male and female drinking driver fatalities, but drivers between 19 and 65 years of age were more likely than younger and older drivers to show a reduction in the percentage of fatalities that involved alcohol.

It was also noted that the percentage of all alcohol-involved driver fatalities was lower on weekends following the introduction of MAS. A potential explanation of this finding is that drivers were deliberately taking action to avoid driving after consuming alcohol on weekends as a means to reduce their exposure to being stopped by the police and screened for the presence of alcohol. Although somewhat speculative, the data are consistent with a general deterrence perspective.

At first glance, the substantial increase in the number of police-reported impaired driving incidents during the first full year of MAS appears to be contrary to the overall objective of MAS. However, the switch from using sensory and observational techniques to detect alcohol to an inherently more reliable and accurate technological approach (i.e., Approved Screening Devices) would be expected to increase the rate of detection and virtually eliminate the probability that drinking drivers could escape detection in checkpoints. As a consequence, the initial effect of implementing MAS could be an increase in the number of reported impaired driving incidents due to its greater effectiveness in identifying alcohol-impaired drivers. As awareness of MAS increases throughout the population of drivers and knowledge of the enhanced probability of drinking drivers being detected by the police becomes widespread, it is expected that the overall prevalence of impaired driving will be reduced and the number of reported incidents will fall.

The data provided by Edmonton Police Service provide clear evidence of the efficiency and effectiveness of MAS enforcement. Not only does it demonstrate that the screening of virtually all drivers in checkpoints for alcohol with an ASD can be done quickly without affecting the number of drivers checked, it also shows that more drinking drivers are detected. Increased awareness of MAS among drivers, along with the knowledge that they cannot escape detection, are key components of effective deterrence.

The findings from this study provide reason for optimism about the beneficial impact of MAS in Canada. However, it serves to be repeated that the results are based on preliminary data from several jurisdictions and the findings may not be representative of those in other jurisdictions. It is also acknowledged that investigations of fatal crashes can require considerable time, and not all cases may have been complete at the time the data were made available for this study. In addition, no attempt was made to assess the extent to which MAS was implemented in the jurisdictions or to take account of other programs and policies related to impaired driving that may have contributed to the observed results. Further investigation over the next several years will be instrumental in assessing the longer-term impact of MAS and refining the approach to implementation to enhance and sustain a beneficial effect on impaired driving.

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