TRAFFIC INJURY RESEARCH FOUNDATION

ROAD SAFETY MONITOR 2017
DRUGS & DRIVING IN CANADA

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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.

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DRUGS & DRIVING IN CANADA

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TABLE OF CONTENTS

INTRODUCTION

This study summarizes national results from the 2017 Road Safety Monitor (RSM) regarding drugs and driving in Canada. The RSM is an annual public opinion survey conducted by the Traffic Injury Research Foundation (TIRF) in partnership with Beer Canada and Desjardins Insurance. The survey takes the pulse of the nation on key road safety issues by means of an online survey of a random, representative sample of Canadian drivers.

Data on drugged driving behaviours and attitudes have been collected as part of the TIRF RSM series since 2002, specifically in the years 2002, 2004, 2005, and from 2010 onward. Results are based on analyses of RSM 2017 data, the most recent data available, and trends comparing with previous years when appropriate.

Despite a growing body of research on drugs and driving, it can be argued that our understanding of how drugs affect driving behaviours is limited compared to what is known about alcohol. A brief literature review summarizing answers to key questions is below with more information available in TIRF's Drug-Impaired Driving Learning Centre (druggeddriving.tirf.ca).

How is drugged driving different from alcohol-impaired driving? Per se blood alcohol concentration (BAC) limits are based upon decades of experimental research that demonstrate a clear dose-response relationship between alcohol and driving impairment. Most importantly, results show that all persons would be impaired and unable to safely operate a vehicle at this limit. This is not the case for drugs. Specifically, for many illegal and legal drugs, there is a lack of consensus about the specific threshold at which a drug may impair driving abilities for all drivers since a clear dose-response relationship has not been established for many types of drugs. This is because the impairing effects of many drugs may vary over time (CCSA 2016). Additionally, the effect of different concentrations of a drug may vary across users depending on age, sex, frequency of use, metabolism/body fat, and presence of other impairing substances (CCSA 2016). The impairing effects of some drugs may also diminish over time and the presence of higher levels of a drug in the body may not be correlated with increased impairment.

How do drugs affect the body and behaviour? Drugs that can impair driving are categorized according to the seven drug categories established by the International Drug Evaluation and Classification Program (DECP). These include: cannabis, central nervous system (CNS) depressants, central nervous system (CNS) stimulants, hallucinogens, dissociative anesthetics, narcotic analgesics, and inhalants. Information about cannabis, CNS depressants and CNS stimulants are provided in this section since these drugs are more commonly detected in drivers. For additional information about other categories of drugs see http://druggeddriving.tirf.ca/module/the-effects-of-drugs-on-driving.

Although low doses of cannabis produce mild to moderate impairment in cognitive and psychomotor abilities, larger doses produced significant impairment in cognitive, psychomotor and driving performance. The driving measures that are impaired include variability in speed maintenance, variability in lane maintenance (i.e., weaving), increased variability in headway, and increased reaction times (Hart et al. 2001; Sexton et al. 2000; Hartman et al. 2016).

CNS depressants slow down the activity of the central nervous system resulting in sedation, relaxation, and impaired motor coordination (DECP 2016; Jonah 2012). Drugs included in the CNS depressant category can be medicinal, legal or illegal. Specifically the use of benzodiazepines and non-benzodiazepine hypnotics is also associated with a moderately elevated crash risk (Drummer & Yap 2016).

CNS stimulants affect the areas of the brain responsible for attention, perception, and other cognitive and motor functions. Drugs included under the CNS stimulants category include cocaine, amphetamines, and synthetic cathinones. Drivers using CNS stimulants, such as amphetamines and cocaine, double their risk of injury (odds ratio 2.10). Furthermore, stimulant use has been associated with a significantly increased risk of fatal crash involvement, with an odds ratio of 3.57 (Li et al. 2013).

What legislation and penalties apply to drugged drivers in Canada? In Canada, criminal law is the responsibility of the Federal government and is uniform across all jurisdictions. Under section 253 of the Criminal Code of Canada (CCC), it is an offence to operate a vehicle while impaired by alcohol, a drug, or a combination thereof (Department of Justice Canada 2013). While a per se limit is used for alcohol-impaired driving, Canada currently employs a behavioural impairment legislative approach to drug-impaired driving, and peace officers must collect and document evidence of behavioural impairment to charge a suspected impaired driver. In 2008, changes to the CCC under section 254, provided that drivers suspected of drug-impairment submit to the Standardized Field Sobriety Test (SFST) (Jonah 2014). The SFST is a three test battery that includes the horizontal gaze nystagmus (HGN), the walk-and-turn, and the one-leg stand tests. If the results of the SFST provide reasonable grounds to suspect drug-impairment, drivers can be required to undergo a Drug Recognition Expert (DRE) evaluation by a trained and certified police officer. This assessment involves a series of behavioural and cognitive tests that enables a DRE to determine whether a driver is impaired by drug, and the class of drug(s) likely responsible for the impairment (CCSA 2016; Jonah 2014). A DRE is a law enforcement official who is trained to recognize impairment in drivers due to drugs other than, or in addition to, alcohol. Interchangeably called a drug recognition evaluator in some jurisdictions, DRE certification requires extensive knowledge of the effects of different types of drugs on the body and officers are required to undergo extensive training in order to be qualified to conduct these types of evaluations. The DRE evaluation of a suspected impaired driver consists of a standardized 12-step process designed to assess physical, cognitive and medical indicators (Hartman et al. 2016). Canadian and U.S. evaluations of the DRE program showed that trained officers are able to accurately detect drug impairment in 90-95% of cases (NHSTA 2010; Beirness et al. 2009; Smith et al. 2002). If the DRE results indicate drug-based impairment, these officers can demand a bodily fluid sample from a driver for laboratory testing.

However, substantial changes will take place in 2018 with the passage of Bills C-45 and C-46. Bill C-45 legalizes the cultivation and consumption of recreational cannabis in Canada. Bill C-46 implements changes

to Canada's impaired driving criminal statutes to help manage the road safety implications that legalized cannabis may cause. One of the notable features of Bill C-46 is that it shifts the legislative approach from behavioural impairment to a per se limit. The law is crafted to ensure that the per se limit is subject to Federal regulations. The last reported regulations listed the per se limit at two nanograms (ng) of tetrahydrocannabinol (THC) per millilitre (ml) of blood as the highest levels of THC allowed in the blood before penalties are applied (Health Canada 2017). Both Bills C-45 and C-46 received royal assent June 21, 2018 and will come into effect October 17, 2018.

Penalties for driving under the influence of drugs are often similar to those applied for alcohol-impaired driving and may include incarceration, periods of probationary sentences, substance abuse education or treatment, licence suspensions, alcohol ignition interlocks and/or fines (Section 255 (1) – (3), CCC). The severity of penalties increases in cases involving a crash causing property damage, injury, or death. Furthermore, penalties are more severe for repeat offences. Additionally, ten Canadian jurisdictions (British Columbia, Alberta, Saskatchewan, Manitoba, Quebec, Newfoundland and Labrador, Prince Edward Island, Northwest Territories, Nunavut, and the Yukon) have administrative laws and penalties that can be applied to drivers suspected of being under the influence of drugs.

How prevalent is drugged driving? The number of fatally injured drivers in Canada that test positive for drugs each year is collected and reported in the Traffic Injury Research Foundation's (TIRF) National Fatality Database. In 2014, for example, 81.9% of fatally injured drivers were tested for drugs; among those tested, 42.4% were positive for drugs (Brown et al. 2017). Among these fatally injured drivers who were positive for drugs, 44.7% tested positive for cannabis; 41.2% for CNS depressants; 24.9% for CNS stimulants; and 24.0% for narcotic analgesics. In comparison, 87.7% of fatally injured drivers were tested for alcohol in 2014; among those tested, 28.5% tested positive for alcohol. Therefore, more fatally injured drivers tested positive for drugs than for alcohol in 2014.

42.4% fatally injured drivers tested postive for drugs compared to 28.5% tested positive for alcohol in 2014.

In the general population, the prevalence of drugs and driving can also be measured via roadside surveys. A roadside survey in British Columbia (Beirness & Beasley 2011) of 2,840 drivers showed that drugs were detected in 7.2% of drivers tested. This included 4.5% of drivers positive for THC; 2.3% positive for cocaine; 1.2% positive for opiates; and <1% positive for amphetamines or benzodiazepines.

Self-report data also demonstrate the prevalence of the drugged driving problem in Canada. According to data collected in TIRF's RSM series, overall the percentage of Canadian drivers that admitted to drugged driving neither significantly increased nor decreased during the period between 2002 and 2015. However, there was still a large number of Canadian drivers that admitted to getting behind the wheel within two hours of using various substances, particularly prescription drugs that may affect their driving (approximately 3% of Canadian drivers). Of concern is the 62.5% increase in the percentage of drivers reporting driving within two hours of using marijuana from 1.6% in 2013 to 2.6% in 2015 (Robertson et al 2017).

What are some of the characteristics of drugged drivers? Analyses of Canadian data from fatally injured drivers and self-reporting drivers over several years (2000-2015) revealed sex differences with respect to drugged driving (Robertson et al. 2017). Specifically, male drivers were more likely to report using marijuana (2.8% versus 1.5%) and other illegal drugs (0.95% versus 0.34%) before driving. Among fatally injured drivers, males were more likely to test positive for any drug (37% vs. 33.8%), cocaine (6.4% vs. 3%) or marijuana (17% vs. 8.8%) while females were more likely to test positive for CNS depressants (17.9% vs.12.1%).

According to the same study, young drivers aged 16 to 24 years were more likely to admit driving within two hours of using any illegal drug, marijuana or prescription drugs. Among fatally injured drivers, this young cohort was also more likely to test positive for marijuana. However, those aged 25 to 44 years were more likely to test positive for any drug overall and cocaine in particular; and those aged 65 and older were more likely to test positive for CNS depressants.

METHODOLOGY

This edition of the RSM contained approximately 50 items designed to probe the knowledge, attitudes, and concerns of Canadians with respect to a range of road safety issues, and to obtain information on their driving practices. The survey required an average of approximately 10 minutes to complete.

The survey was administered online to a random sample of Canadian drivers aged 16 years and older who had driven in the past 30 days and had a valid driver's licence. The sample was stratified by province and weighted according to sex and age to avoid bias. Nielsen Opinion Search Inc. fielded this survey in September, 2017.

A total of 2,018 qualified drivers completed the survey. Based on a sample of this size, on average, the results can be considered accurate within plus or minus 2.2%, 19 times out of 20. The majority of the questions were answered using a scale from one to six where one indicated low agreement, concern or support and six indicated high agreement, concern, or support.

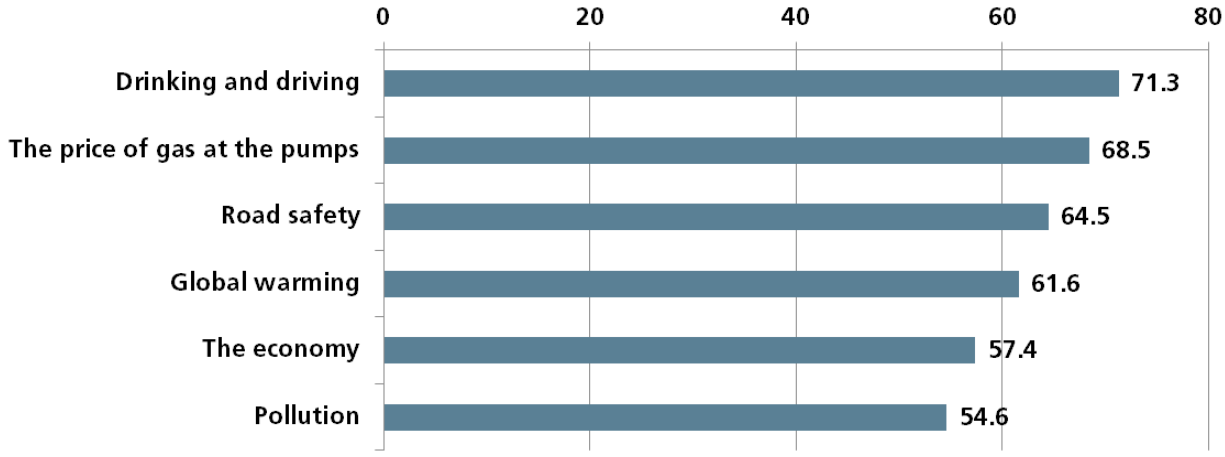
The data were analyzed using Stata 14.1, taking into account the stratified and weighted sampling design, using both univariate and multivariate approaches. Linear and piece-wise regression models were estimated to analyze possible trends in drugs and driving. As well, logistic regression analyses were conducted to evaluate statistical significance of results, while also controlling for sex and age differences within the population, where applicable.

RESULTS

Where does road safety stand among other societal issues?

To put the issue of road safety into context, drivers were asked to rate how concerned they were about eight societal issues (see Figure 1). Among Canadian drivers, 71.3% reported that they were very or extremely concerned about drinking and driving followed by the gas price at the pumps at 68.5%. Road safety in general ranked third with 64.5% of Canadian drivers being very or extremely concerned about this issue. Respondents reported that they were very or extremely concerned about other issues to a lesser extent, including global warming (61.6%), the economy (57.4%) and pollution (54.6%).

Figure 1: Percentage of Canadians who were very or extremely concerned about different societal issues



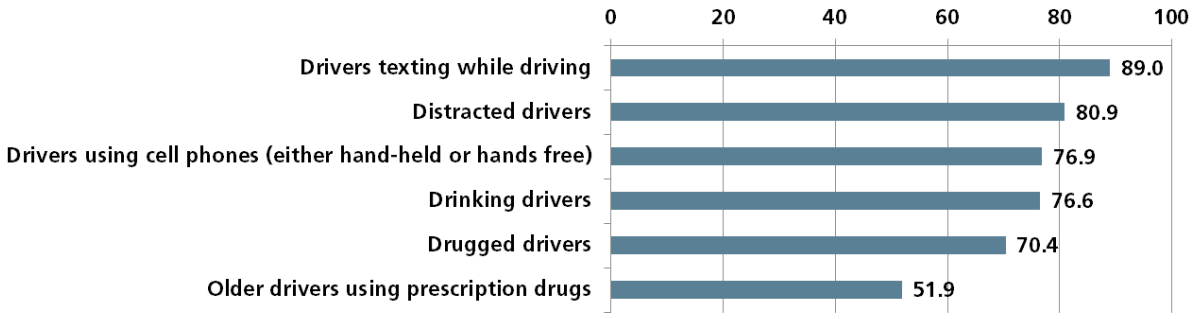
Are Canadians concerned about the issue of drugged driving?

Specifics topics within road safety were also put into context by asking drivers to rate how concerned they were about it (Figure 2). Results showed that the majority of Canadians agreed that drugged drivers are a very or extremely serious problem. Overall, 70.4% of respondents said they believed that drugged drivers posed a serious threat to traffic safety. However, there seemed to be even more concern about

other issues as 89% of Canadian drivers indicated that texting while driving was a very or extremely serious issue ($p<0.0001$). A much smaller percentage of respondents (51.9%) viewed older drivers impaired by prescription drugs as a very or extremely serious issue ($p<0.0001$).

When comparing public concern about drugged driving behaviours to concerns related to drinking and driving or distracted driving, it was evident that drinking and driving and distracted driving continued to be perceived as a serious issue to a larger percentage of Canadians in 2017. A majority of Canadian drivers were very or extremely concerned about the problem of distracted drivers in general (80.9%) and more particularly about cell phone use (76.9%), specifically about texting on their phone while driving (89%), compared to the 70.4% who believed that drugged drivers were a serious issue ($p<0.0001$). As well, more respondents (76.6%) were concerned about drinking drivers compared to the 70.4% who were concerned about drugged drivers ($p<0.0001$).

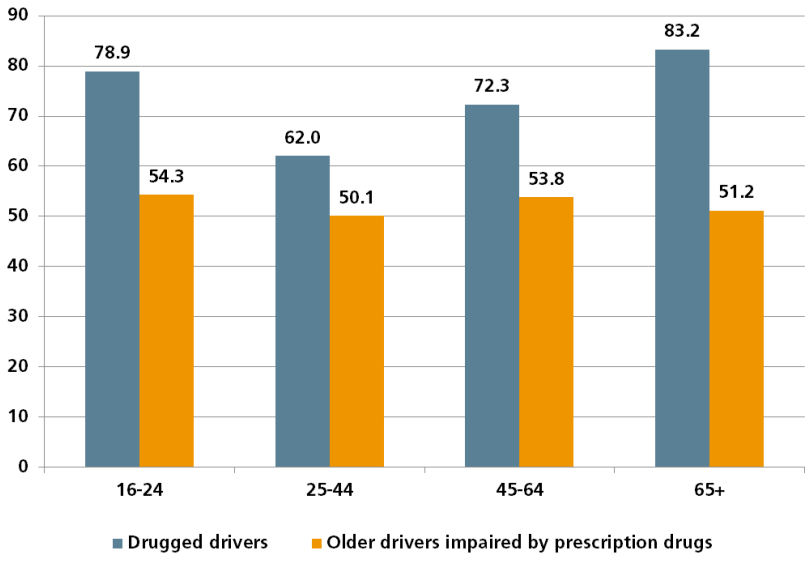
Figure 2: Percentage of Canadians concerned about road safety issues



Who is concerned about drugged driving?

According to the results of the poll, the oldest drivers in Canada were the most concerned about drugged drivers (Figure 3). Approximately 83.2% of drivers aged 65 and older reported that drugged drivers were a very or extremely serious issue with respect to road safety. This percentage was significantly larger as compared to concern expressed by drivers aged 25 to 44 years (62%) and 45 to 64 years (72.3%) who considered drugged drivers to be a serious road safety issue ($p<0.001$).

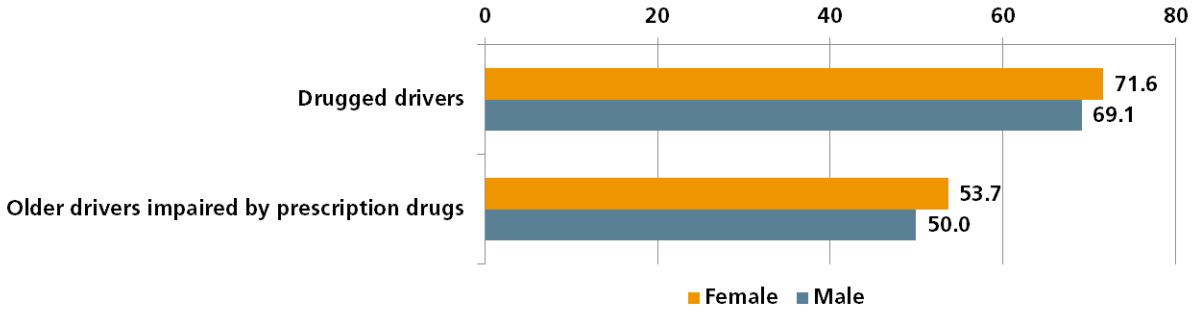
Figure 3: Percentage of Canadians who were concerned about drugged driving per age category



Additionally, no significant difference was found between the percentage of female respondents (71.6%) who viewed drugged drivers as a very or extremely serious problem and the percentage of male respondents (69.1%) (Figure 4).

In terms of concern for older drivers impaired by prescription drugs, there were no significant differences between drivers according to age category or sex.

Figure 4: Percentage of Canadians who were concerned about drugged driving by sex



Logistic regression models controlling for age and sex confirmed the above results (see Table 1). Overall, drivers aged 45 or more were more likely to be concerned about drugged drivers than drivers aged 25 to 44 years old.

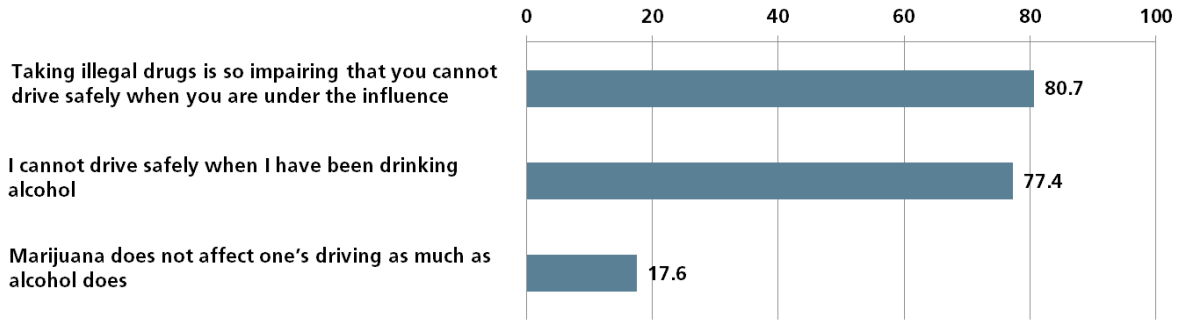
Table 1: Odds ratios for drivers reporting concern about drugged driving controlling for sex and age
***p-value<0.05**

	Sex		Age			
	Female	**Male**	**16- 24**	**25-44**	**45-64**	**65 or older**
Drugged drivers	1.1	base	2.3	base	1.6*	3.0*
Older drivers impaired by prescription drugs	1.2	base	1.1	base	1.2	1.2

What do Canadians believe about drug tests and drugged driving?

Canadian drivers were asked whether they agreed with a series of statements regarding their perception about the impairing effect of drugs on driving and the use of drug tests. Overall 80.7% of Canadian drivers believed that illegal drugs are so impairing that it is not safe to drive under their influence (Figure 5). As a comparison, 77.4% of Canadian drivers had a similar belief with respect to driving impaired by alcohol. However, 17.6% believed that marijuana does not impair driving as much as alcohol, and younger drivers were more likely to believe this (drivers aged 16 to 24 compared to those aged 65 or older, OR=5.5, p<0.05, 38.8% vs. 10.3%).

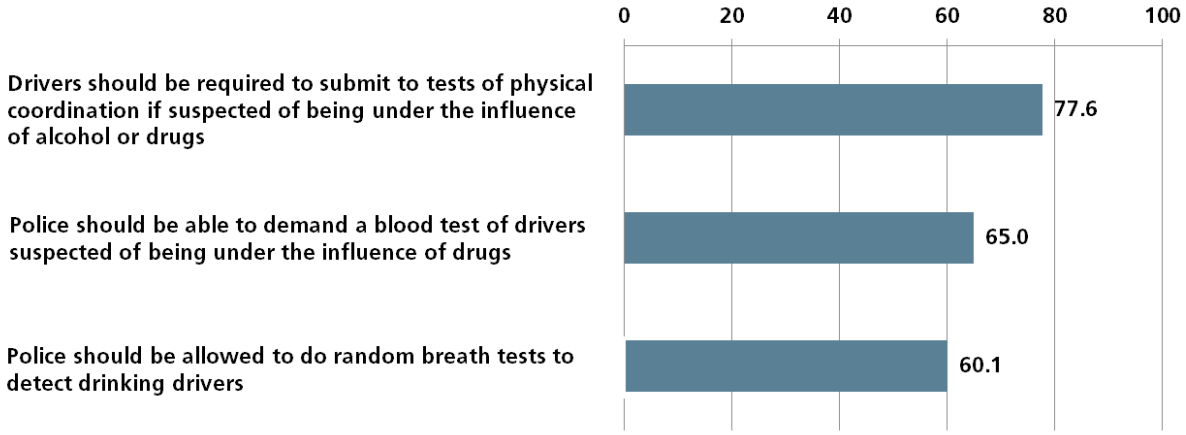
Figure 5: Percentage of Canadians who agreed with statements regarding the impairing effect of drugs on driving



Similarly, respondents were asked if they agree with statements about police testing of drivers for drugs or alcohol. Overall, the majority agreed with the statements about the different use of tests (Figure 6). Specifically, 77.6% of Canadian drivers indicated that drivers should be required to submit to tests of physical coordination if suspected of being under the influence of alcohol or drugs. However, fewer respondents (65.0%) believed that police should be able to demand a blood test from drivers suspected of being under the influence of drugs, and a slightly smaller percentage reported that police should be allowed to do random breath tests to detect drinking drivers (60.1%).

77.6% of Canadian drivers indicated that drivers should be required to submit to tests of physical coordination if suspected of being under the influence of alcohol or drugs.

Figure 6: Percentage of Canadians who agreed with statements regarding the use of tests on drivers



Overall, older and female drivers were more likely to agree with the statements about police testing of drivers for drugs or alcohol (Figures 7 and 8). An exception was that young drivers aged 16 to 24 were more likely to agree that drivers should be required to submit to tests of physical coordination if suspected of being under the influence of alcohol or drugs, in comparison to drivers aged 25 to 64, but this result was not significantly different from drivers aged 65 or older.

Figure 7: Percentage of Canadians who agreed with drugged driving police actions by age

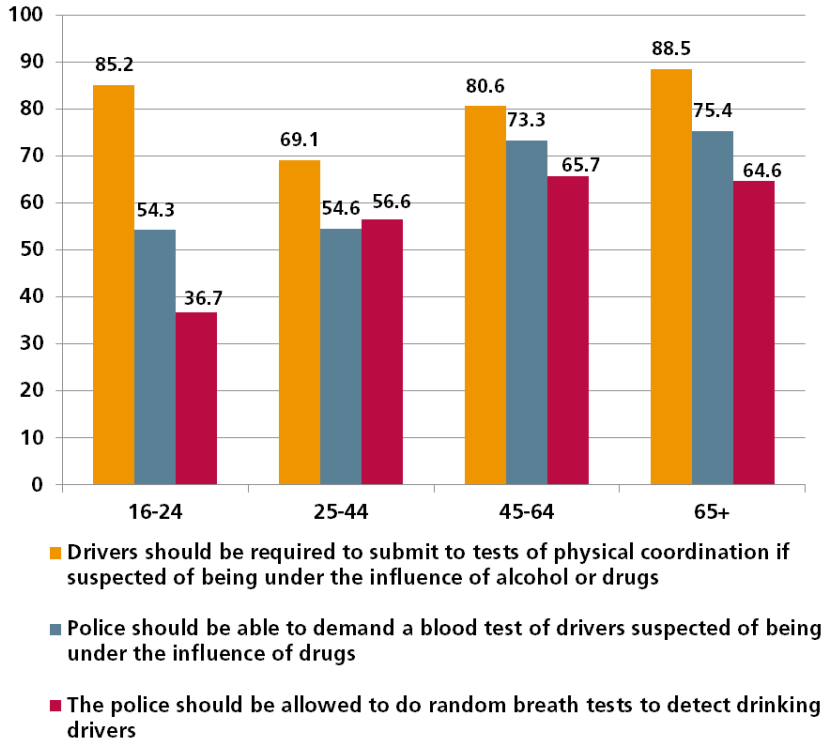
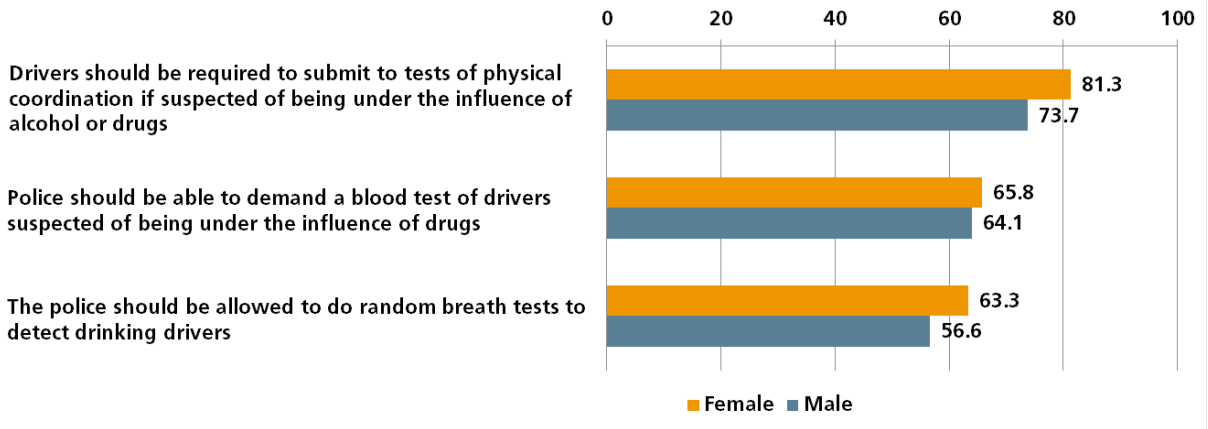


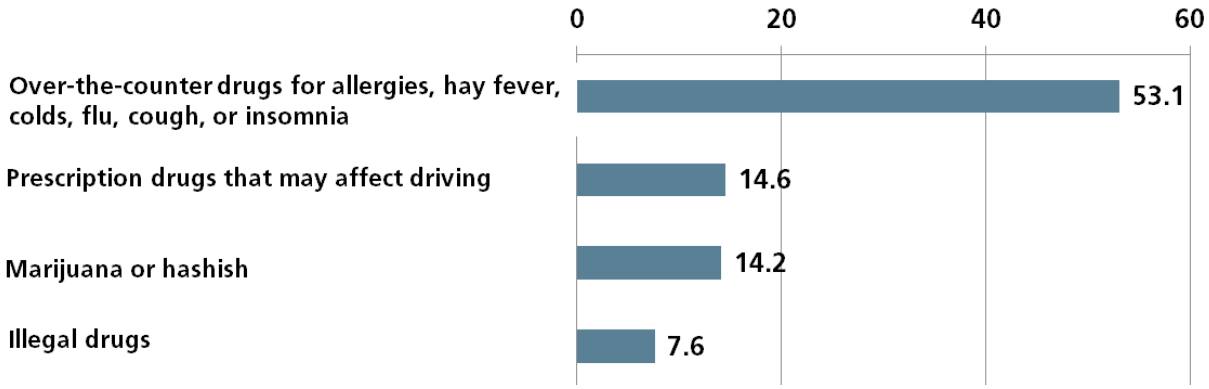
Figure 8: Percentage of Canadians who agreed with drugged driving police actions by sex



What is the prevalence of drug use in Canada?

Results from the 2017 RSM data revealed that a noticeable proportion of the Canadian driver population admitted to using both illicit and licit drugs that are known to affect driving ability at some point within the past year. Note that these data refer to drug use only, and not the prevalence of drugged driving among Canadian drivers, which is discussed in the next section.

Figure 9: Percentage of Canadians using drugs in the last 12 months

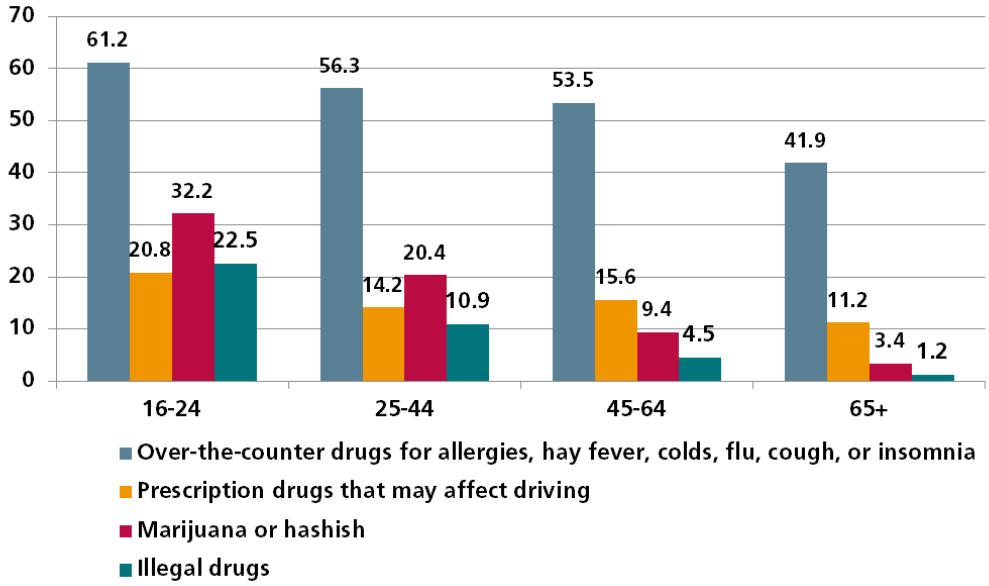


Approximately 14.2% of the Canadian driver population reported using marijuana or hashish in the previous 12 months (Figure 9). Almost three-quarters of marijuana users (71.8%), were between the ages of 16 and 44 years. A smaller percentage of the population reported using illegal drugs (7.6%) compared to those who used marijuana or hashish, but a similar distribution of use among age categories was evident. Again, almost three-quarters of illegal drug users (75.7%), were between the ages of 16 and 44 years. It should be recognized that while marijuana use is discussed separately from the broader category of illegal drug use in this report, unauthorized possession, distribution and use of marijuana was, according to the CCC, prohibited in Canada and was considered within the illegal drug category as of the time of this survey.

Overall, one in seven Canadian drivers (14.6%) reported using prescription drugs that they have been advised might affect their driving. The age distribution of prescription drug users differed from the distribution of marijuana and illegal drug users in that 8.7% were between the ages of 16 to 24 years; 39.3% were aged 25 to 44 years; 38.8% were aged 45 to 64 years; and, 13.5% of people who reported taking potentially impairing prescription drugs were aged 65 or older. A large percentage of Canadians (53.1%) reported using over-the-counter drugs for allergies, hay fever, cold, flu, cough or insomnia in the last 12 months.

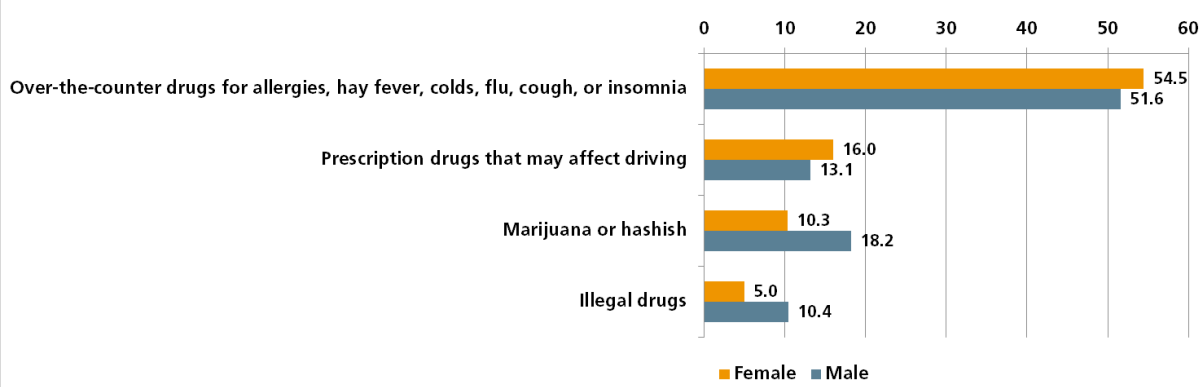
Figure 10 shows that, overall, young drivers were more likely to use illegal drugs and marijuana as well as over-the-counter drugs for allergies and other conditions.

Figure 10: Percentage of Canadians using drugs in the last 12 months by age categories



In terms of sex, male drivers were more likely to use illegal drugs and marijuana in the last 12 months (OR=2.2, 1.9, p<0.05; 10.4% vs. 5.0% and 18.2% vs. 10.3%) (Figure 11).

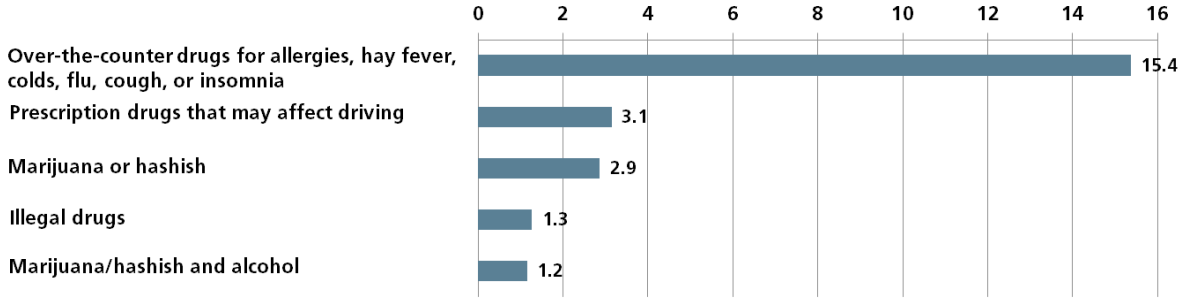
Figure 11: Percentage of Canadians using drugs in the last 12 months by sex



What is the prevalence of drugged driving in Canada?

Although results revealed that many drivers in Canada admitted to using drugs that may affect their driving, the data indicated that a smaller percentage of the population admitted to getting behind the wheel while under the influence of these drugs in 2017 (Figure 12).

Figure 12: Percentage of drivers who drove within two hours of taking drugs in the past 12 months



The main type of drug that drivers reported using before driving was over-the-counter drugs for allergies, hay fever, cold, flu, cough or insomnia. Approximately one in six (15.4%) of Canadian drivers admitted to this behaviour. Young drivers aged 16 to 24 years were more likely than those aged 65 and older to report this behaviour (OR=3.6, p=0.007; 26.6% vs. 9.1%).

Approximately 3.1% of drivers in Canada reported driving within two hours of taking prescription drugs that they had been advised may affect their driving. No significant difference in the prevalence of driving after prescription drug use was found between specific groups of drivers, with respect to age and sex. However, those drivers that had been injured (OR=2.2, p=0.04; 5.4% vs. 2.7%) and those with tickets (OR=5.0, p<0.001; 10.2% vs. 2.6%) were more likely to admit to driving within two hours of taking prescription drugs.

Almost three percent (2.9%) of Canadian drivers said that they had driven a motor vehicle within two hours of using marijuana or hashish at least one time during the previous 12 months in 2017. Among drivers who admitted to this behaviour, 22.2% were between the ages of 16 to 24 years; 49.7% were between 25 to 44 years old; and, 28.1% were at least 45 years old. Young drivers aged 16 to 24 years

were more likely than those aged 65 and older to drive within two hours of using marijuana and hashish (OR=25.9, p=0.006; 10.6% vs. 0.3%). Additionally, significant differences were found with respect to sex among drivers who drove within two hours of using marijuana. Many more male drivers (5.1%) versus 0.8% female drivers reported this behaviour (OR=6.8, p<0.001). Drivers who had been injured in a motor vehicle crash (OR=2.8, p=0.02; 4.5% vs. 2.5%) and those with tickets (OR=3.1, p=0.03; 10.2% vs. 2.3%) were more likely to admit engaging in drugged driving after using marijuana or hashish.

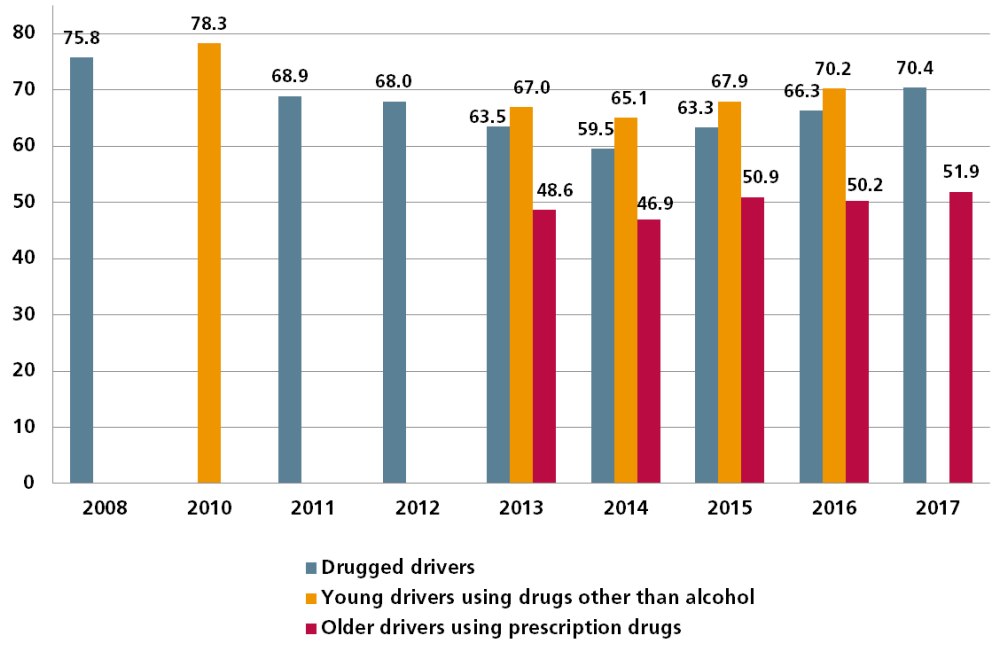
Approximately 1.3% of the Canadian driver population admitted that they have driven a motor vehicle within two hours of taking other illegal drugs in the previous year. Due to the small number of respondents who admitted this behaviour, it was not possible to discern with statistical accuracy the proportion of people, with respect to the larger population, who engaged in driving after taking illegal drugs based on age or sex factors.

Slightly more than one percent (1.2%) of the Canadian driver population admitted that they had driven a motor vehicle within two hours of using marijuana or hashish in combination with alcohol. Similar to the previous category of illegal drugs, it was not possible to analyze the data by sex and age.

Trends in drugged driving

The same questions about drugged driving have also been asked in previous years, therefore results can be compared to examine trends over time. Since 2008, the first year that data were collected with respect to concern for drugged drivers, there has been a noticeable decline in public concern about drugged drivers until 2014 (Figure 13). The decreasing trend in the percentage of Canadians who were concerned about drugged drivers (from 75.8% in 2008 to 59.5% in 2014) was found to be statistically significant (coef.=-2.6, p=0.001). However, this decrease was followed by an increasing trend that has risen every year from 63.3% of Canadian drivers concerned about drugged drivers in 2015 to 70.4% in 2017 (coef.=3.1, p=0.001).

Figure 13: Trends in the percentage of Canadians who are very or extremely concerned about drugged drivers, 2008-2017s

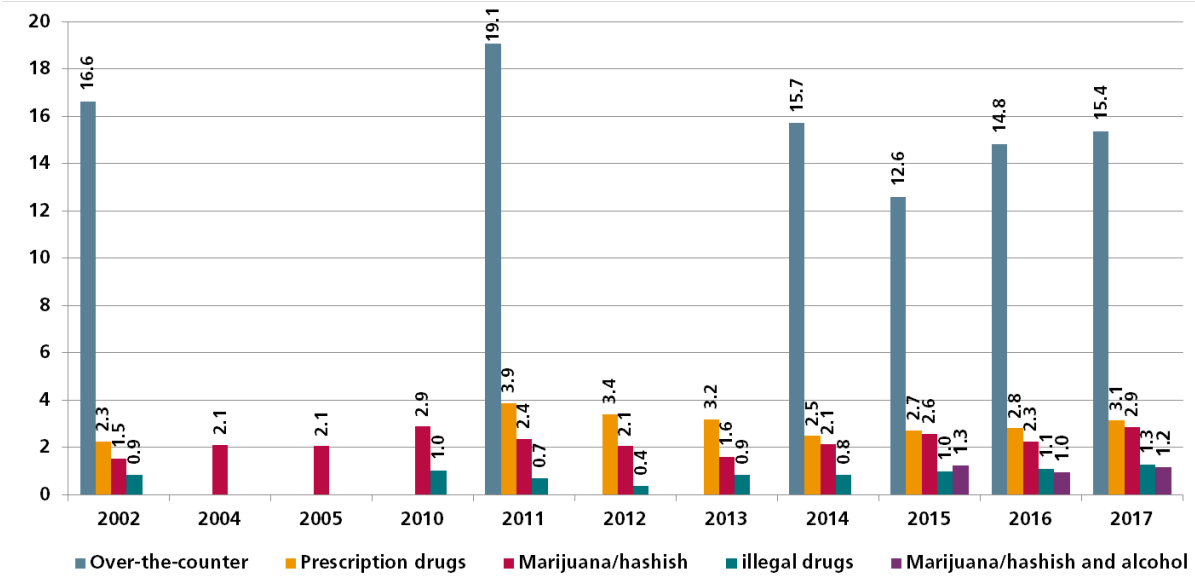


Historically, the percentage of Canadian drivers concerned about young drivers using drugs other than alcohol has been larger than the percentage of drivers concerned about drugged driving in general ($p<0.05$). Similar to the general concern about drugged driving, concern about young drivers using drugs increased from 65.1% in 2014 to 70.3% in 2016 (coef.=2.9, p=0.03).

There seems to be less concern with respect to older drivers using prescription drugs, with a smaller percentage of Canadian drivers being concerned about this issue over the years (from 47% to 52%).

For several years, respondents were asked whether or not they had driven within two hours of using drugs. Figure 14 shows the prevalence of self-reported drugged driving in Canada since 2002, for all years in which related items were included in the survey. Note that there are no data for 2003, and from 2006 to 2009. Furthermore, there are no data on the use of illegal and prescription drugs in 2004 and 2005; and prescription drugs in 2010. The data on marijuana or hashish and alcohol has been collected since 2015 and data about over-the-counter drugs were collected in 2002, 2011 and from 2014 onward.

Figure 14: Trends in the percentage of drugged drivers in Canada, 2002-2017



During this time frame, over-the-counter drugs was the type of drug that more drivers reported using before driving. There were no significant trends in the use of over-the-counter drugs before driving during these years. The percentage of drivers reporting this behaviour has not change significantly from 16.6% in 2002 to 15.4% in 2017.

Over-the-counter drugs was the type of drug that more drivers reported using before driving.

The prevalence of driving within two hours of using potentially impairing prescription drugs has also remained relatively constant overall. While there was a significant increase in the prevalence of driving after prescription drug use from 2.3% in 2002 to 3.9% in 2011 (p=0.02) there was a downward trend from 3.9% in 2011 to 2.8% in 2016 (coef.=-0.23, p-value=0.035). There was an insignificant increase in 2017 to 3.1%.

A smaller percentage of drivers have consistently admitted to driving under the influence of marijuana or hashish compared to prescription drugs. In 2002, approximately 1.5% of Canadian drivers reported driving within two hours of using marijuana or hashish. This percentage was the largest at 2.9% in 2010 but declined during the next three years to 1.6% in 2013, before rising again to 2.1% in 2014, 2.6% in 2015 and 2.9% in 2017. The apparent spike in 2010 to almost three percent of Canadian drivers was significantly higher than the percentage of drivers who reported driving while under the influence of

marijuana or hashish in 2002 (Z=-2.3, p=0.01) and in 2013 (Z=2.26, p=0.02). A regression model for the use of marijuana or hashish before driving using a piecewise linear function for time (knots in 2010 and 2013 where spikes were observed) revealed an increasing trend (coef.=0.15, p=0.001) between 2002 and 2010, before reversing to a decreasing trend (coef.=-0.36, p=0.002) until 2013, and increasing again (coef.=0.27, p=0.002) between 2013 and 2017.

The prevalence of driving while under the influence of other illegal drugs has remained steady in past years. In 2002, 0.9% of Canadian drivers admitted to driving within two hours of taking an illegal drug at least once in the previous 12 months. In 2012, a low of 0.4% was reported, but this rose to 0.9% in 2013 and dropped slightly to 0.8% in 2014. This percentage has remained approximately 1% between 2015 and 2017. However, a piecewise linear function (time knot in 2012) revealed an increasing trend (coef.=0.11, p=0.02) in the last period from 2012 to 2017.

Similarly, the percentage of drivers who indicated they drove within two hours of taking marijuana or hashish combined with alcohol has not changed significantly from 1.3% in 2015 to 1.0% in 2016 and 1.2% in 2017.

Analyses of RSM data from 2002 to 2017 revealed significant sex differences in the prevalence of illegal drugs, and also marijuana use, while driving (see Table 2). Overall, 1.5% of male drivers versus 0.5% of female drivers reported driving within two hours of taking an illegal drug at least once in the previous 12 months; the independence tests revealed significant differences (p<0.0001). With respect to the prevalence of marijuana use, 3.3% of male drivers versus 1.3% of female drivers reported driving within two hours of using marijuana (p<0.0001). No significant sex differences were found with respect to the prevalence of prescription drugs. Male drivers were also more likely than female drivers to drive after taking over-the-counter drugs that may affect their driving (17.1% vs. 14.3%, p=0.01) or after using marijuana combined with alcohol (1.5% vs. 0.7%, p=0.04).

Table 2: Percentage reporting driving within two hours of taking drugs in the past 12 months: 2002-2017

	Sex			Age				
	Female	Male	p-value	16- 24	25-44	45-64	65 or older	p-value
illegal drugs	0.5	1.5	<0.0001	2.3	1.4	0.4	0.2	<0.0001
marijuana/hashish	1.3	3.3	<0.0001	6.4	3.0	1.1	0.2	<0.0001
prescription drugs	2.7	3.4	0.1	4.0	3.6	2.5	2.0	0.02
over-the-counter	14.3	17.1	0.01	20.2	18.3	14.9	8.1	<0.0001
marijuana/hashish /alcohol	0.7	1.5	0.04	1.3	1.8	0.8	0.3	0.01

Differences were also found with respect to age categories and the prevalence of illegal drugs and marijuana. A larger percentage of young drivers (aged 16 to 24 years) reported driving within two hours of taking an illegal drug (2.3%) or marijuana (6.4%), or prescription drugs (4.0%), or over-the-counter drugs (20.2%) in comparison to any other age group. Furthermore, the prevalence of use of these drugs before driving decreased with age. In the case of driving after consuming marijuana combined with alcohol, drivers aged 25 to 44 years were more likely (1.8%) to report such behaviour than drivers in any other age group.

Logistic regression models controlling for sex, age and data year confirmed the above results (Table 3).

Table 3: Odds ratios for drivers reporting driving within two hours of taking drugs in the past 12 months controlling by year and region: 2002-2017 *p-value<0.05						
	Sex		Age			
	Female	Male	16- 24	25-44	45-64	65 or older
illegal drugs	base	2.7*	10.6*	6.6*	2.3	base
marijuana	base	2.4*	30.3*	13.7*	5.0*	base
prescription drugs	base	1.2	2.1*	1.9*	1.3	base
over-the-counter	base	1.2*	2.8*	2.5*	2.0*	base
marijuana/hashish /alcohol	base	2.2*	5.3*	7.1*	2.8	base

CONCLUSIONS

Results from the 2017 RSM and previous years showed that drugged driving continues to be a prevalent issue among Canadians. Although there was a slight decline in the perceived seriousness of the problem of drugged drivers from 2008 (first year of available data) to 2014, the last three years (2015, 2016 and 2017) have revealed an increase in concern about this issue among Canadian drivers, particularly about young drivers using drugs. While the available data suggested that the percentage of drivers that admitted to driving after using prescription or over-the-counter drugs that may affect their driving remained steady or decreased over the past years, there was still a large number of Canadian drivers getting behind the wheel while under the influence of various substances. Of concern are the increasing trends in the percentages of drivers that report to driving within two hours of using marijuana or hashish from 2013 to 2017 and other illegal drugs from 2012 to 2017.

The data from 2017 revealed significant sex differences among drugged drivers. Male drivers were more likely to drive under the influence of illegal drugs including marijuana and hashish. Young drivers (aged 16 to 24 years) were more likely to admit to driving under the influence of over-the-counter drugs and also illegal drugs including marijuana or hashish. Furthermore, drivers injured in vehicle crashes or with traffic tickets were more likely to admit to driving under the influence of illegal drugs including marijuana or hashish, prescription drugs, and also the combination of alcohol and marijuana.

An analysis of RSM data from 2002 to 2017 also found that young (aged 16 to 24 years) and male drivers were more likely to admit to driving within two hours after using illegal drugs including marijuana or hashish and over-the-counter drugs. Male drivers were also more likely to report driving after consuming alcohol and marijuana combined, and drivers aged 25 to 44 years were more likely to report this behaviour.

To summarize, there were increasing trends in the percentage of drivers who reported driving within two hours of using illegal drugs including marijuana or hashish in more recent years. Particularly, male and young drivers were more likely to report this behaviour. These findings highlight the need for increased public awareness about the risks associated with drugs and driving.

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