MARIJUANA USE AMONG DRIVERS IN CANADA, 2000-2015

Traffic Injury Research Foundation, October 2018

Introduction

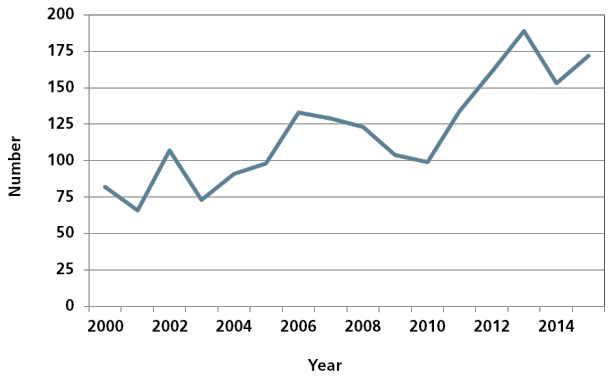
Public concern about drug-impaired driving in general and marijuana-impaired driving in particular has increased in recent years. Marijuana studies have shown that the psychoactive chemical delta-9-tetrahydrocannabinol (or THC) enters the user's bloodstream and brain immediately after smoking or consuming marijuana, and has impairing effects. In addition, research on drivers in fatal crashes has shown that THC-positive drivers are more than twice as likely to crash as THC-free drivers (Grondel 2016). There is also evidence from surveys of Canadian drivers suggesting that the prevalence of marijuana use is greater among drivers aged 16 to 19 years than drivers in other age groups (Robertson et al. 2017). With the legalization of recreational marijuana in Canada, continued monitoring of this road safety topic is timely.

This fact sheet, sponsored by Desjardins, examines the role of marijuana in collisions involving fatally injured drivers in Canada between 2000 and 2015. Data from TIRF's National Fatality Database were used to prepare this fact sheet which explores trends in the use of marijuana among fatally injured drivers, and the characteristics of these drivers.[1] Other topics that are examined include the presence of different categories of drugs among fatally injured drivers in different age groups as well as comparisons of the presence of marijuana and alcohol among this population of drivers.

Trends in marijuana use among fatally injured drivers

The number of fatally injured drivers who tested positive for marijuana from 2000 to 2015 is displayed in Figure 1. In 2000, 82 fatally injured drivers tested positive for marijuana. This number generally increased to 172 in 2015. Almost half (49.0%) of fatally injured drivers killed between 2000 and 2010 were tested for drugs, compared

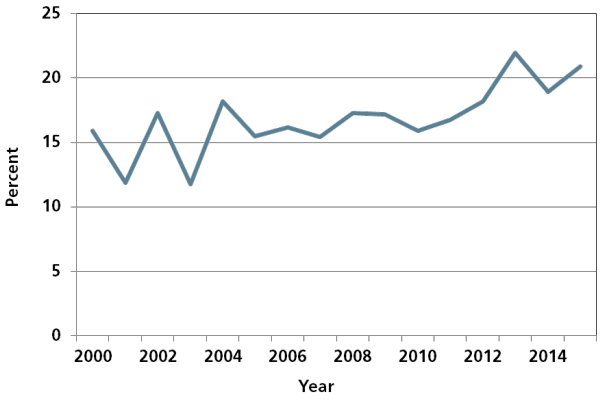
Figure 1: Number of fatally injured drivers who tested positive for marijuana, Canada, 2000-2015



to 79.3% of fatally injured drivers who were killed between 2011 and 2015. Thus, these results should be interpreted with caution. A much larger absolute number of drivers were tested for marijuana during this latter period so it would be expected that from 2011 to 2015, the absolute number of fatally injured drivers who tested positive for marijuana would be larger than during the earlier period.

An analysis of trends related to the percentage of marijuana-positive drivers among all fatally injured drivers who were tested for the presence of drugs was also conducted. Figure 2 shows the percentage of fatally injured drivers in this group who tested positive for marijuana. Among those drivers tested for drugs, 15.9% of fatally injured drivers were positive for marijuana in 2000. This percentage generally increased to 20.9% in 2015.

Figure 2: Percentage of fatally injured drivers who tested positive for marijuana, Canada, 2000-2015

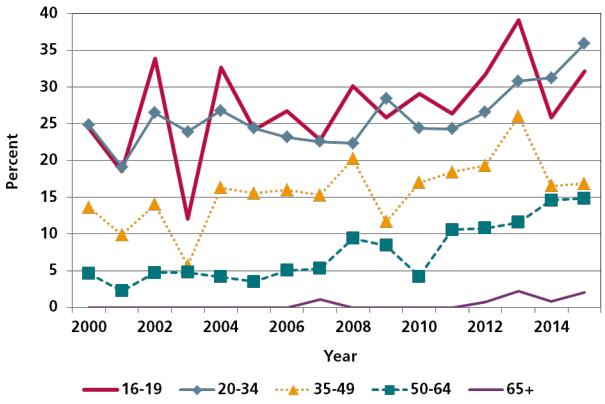


Characteristics of fatally injured drivers testing positive for marijuana

In this section, demographic factors were analyzed to determine their role in marijuana-positive driver fatalities from 2000 to 2015. Fatally injured drivers who tested positive for marijuana were examined according to the age and sex of drivers. These results were further compared to data regarding the presence of alcohol use among fatally injured drivers.

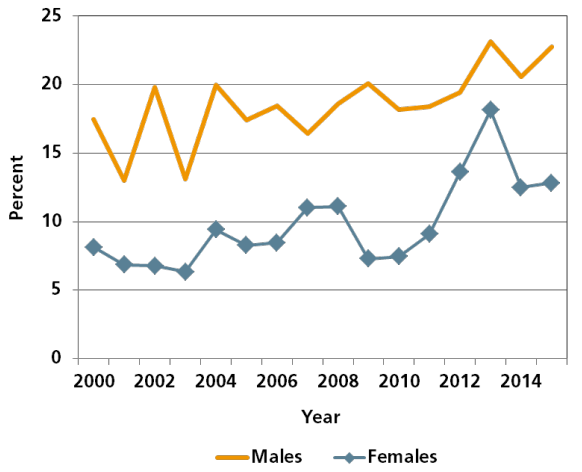
The percentage of fatally injured drivers in each age group who tested positive for marijuana is shown in Figure 3. Drivers were grouped according to the following age categories: 16 to 19 years, 20 to 34 years, 35 to 49 years, 50 to 64 years, and 65 years and older. The percentage of fatally injured drivers aged 16 to 19 years who tested positive for marijuana generally decreased from 2000 (24.5%) to its lowest level in 2003 (12.1%), peaked in 2013 (39.1%), before settling at 32.1% in 2015. The proportion of fatally injured drivers aged 20 to 34 years who tested positive for marijuana generally increased from 2000 (24.9%) to its highest level in 2015 (35.9%). The percentage of fatally injured drivers aged 35 to 49 years who tested positive for marijuana gradually rose between 2000 (13.6%) and 2013 (26.0%) before decreasing to 16.9% in 2015. Among fatally injured drivers aged 50 to 64 years, only 4.7% tested positive for marijuana compared to 14.9% in 2015. In sharp contrast, throughout this 16-year period, a small percentage of fatally injured drivers aged 65 and older tested positive for marijuana (ranging from 0.0% to 2.3%).

Figure 3: Percentage of fatally injured drivers testing positive for marijuana by age group, Canada, 2000-2015



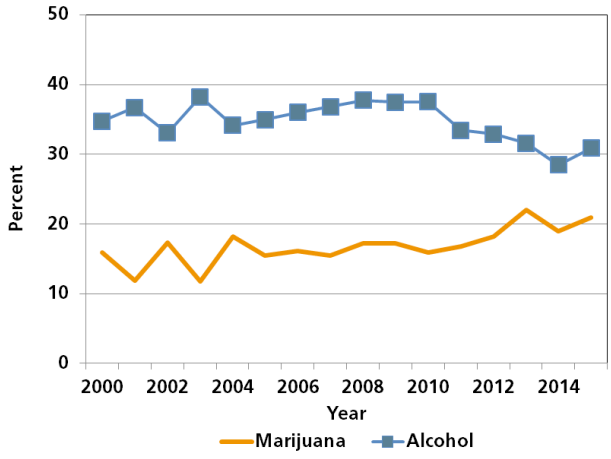
The percentage of male and female fatally injured drivers who tested positive for marijuana is compared in Figure 4. Throughout this 16-year period, male drivers were more likely than females to test positive for marijuana. The percentage of fatally injured male drivers who tested positive for marijuana generally increased from 2000 (17.5%) to 2015 (22.8%). The percentage of fatally injured female drivers who tested positive for marijuana increased between 2000 (8.1%) and 2013 (18.1%), before decreasing to 12.8% in 2015. Although there was an increase from 2010 to 2015 in the percentage of male and female fatally injured drivers who tested positive for marijuana, the increase among male drivers appears to be more pronounced.

Figure 4: Percentage of fatally injured drivers testing positive for marijuana by sex, Canada, 2000-2015



Trends in marijuana use and alcohol use among fatally injured drivers are compared in Figure 5; it shows the percentage of fatally injured drivers who tested positive for each of these substances. A larger percentage of fatally injured drivers tested positive for alcohol than marijuana between 2000 and 2015. In 2000, more than one-third (34.8%) of fatally injured drivers tested positive for alcohol compared to just 15.9% who tested positive for marijuana. However, from 2010 to 2015, the percentage of fatally injured drivers who tested positive for alcohol decreased (from 37.6% to 30.9%), while the percentage of those drivers who tested positive for marijuana increased (from 15.9% to 20.9%).

Figure 5: Percentage of fatally injured drivers testing positive for marijuana and for alcohol, Canada, 2000-2015



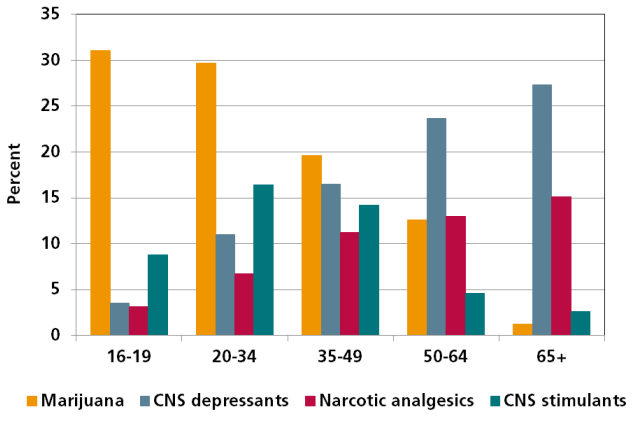
Marijuana and other types of drugs used by fatally injured drivers by age group

Drugs are categorized according to the Drug Evaluation Classification (DEC) program which has been adopted by police services throughout North America. This classification system is based upon common signs and symptoms associated with the presence of different types of drugs (Jonah 2012). The seven drug categories are:

- Cannabis (marijuana);
- Central nervous system (CNS) depressants (e.g., benzodiazepines and antihistamines);
- Central nervous system (CNS) stimulants (e.g., cocaine, amphetamines, and ecstasy);
- Hallucinogens (e.g., LSD, magic mushrooms);
- Dissociative anesthetics (e.g., ketamine and phencyclidine);
- Narcotic analgesics (e.g., morphine, fentanyl, heroin, codeine, oxycodone); and,
- Inhalants (e.g., toluene, gasoline, cleaning solvents).

Figure 6 shows the percentage of fatally injured drivers in each age group who tested positive for each drug type during a five-year period (2011-2015). The drug types shown are marijuana, CNS depressants, narcotic analgesics, and CNS stimulants. Since less than 2.0% of fatally injured drivers tested positive for dissociative anesthetics, hallucinogens, and inhalants, these drug categories are not included in the figure.

Figure 6: Percentage of fatally injured drivers testing positive for different categories of drugs by age group Canada, 2011-2015



Marijuana was the drug most .commonly detected among drivers aged 16 to 19, 20 to 34, and 35 to 49 years old drivers (31.1%, 29.7%, and 19.6% respectively). The prevalence of marijuana aamong fatally injured drivers aged 16 to 19 years is similar to levels that were reported in previous analyses of fatally injured drivers (TIRF 2017). This finding is also consistent with an online survey of Canadian drivers that showed marijuana use was more prevalent among drivers aged 16 to 19 years (6.1%) as compared to drivers aged 25 to 44 years (2.8%), 46 to 64 years (0.9%), and over age 65 (0.1%) between 2002 and 2015 (Robertson et al. 2017). Only 1.2% of fatally injured drivers aged 65 years and older tested positive for marijuana.

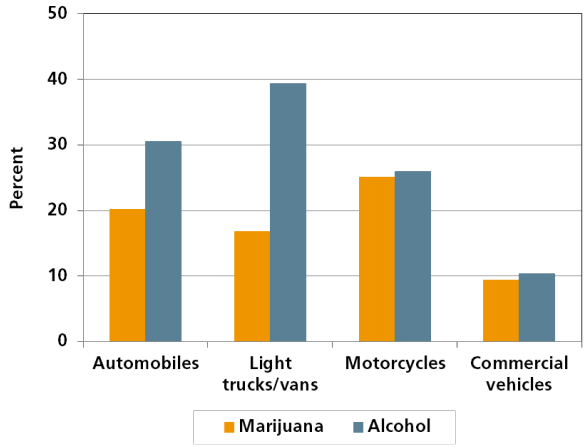
CNS depressants were the type of drug most commonly found among fatally injured drivers aged 50 to 64 and 65 and older (23.7% and 27.3% respectively). Drivers aged 20 to 34 were the most likely to test positive for CNS stimulants (16.4%), and narcotic analgesics were most commonly found among fatally injured drivers aged 65 and older (15.1%).

Characteristics of collisions involving drivers testing positive for marijuana and alcohol

Patterns of marijuana use and alcohol use among fatally injured drivers were compared during a five-year period (2011-2015). Characteristics examined included the type of vehicle driven by the fatally injured driver and the number of passengers who were in that driver's vehicle.

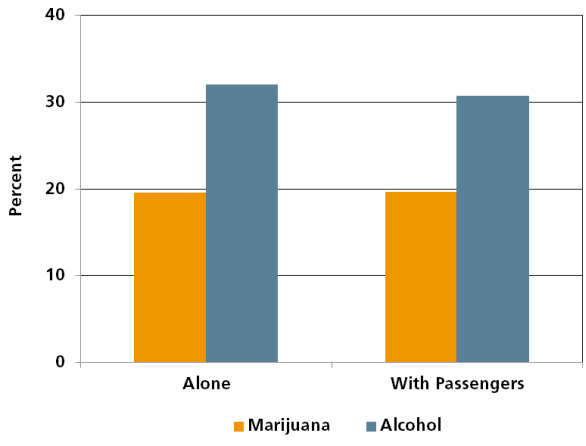
Figure 7 compares the percentage of drivers of different vehicles who tested positive for marijuana and alcohol during this five-year period. The vehicle types are: automobiles, light trucks/vans, motorcycles, and commercial vehicles (heavy trucks and tractor-trailers). As can be seen, fatally injured drivers of light trucks/vans were twice as likely to test positive for alcohol (39.4%) than marijuana (16.8%). Similarly, among fatally injured automobile drivers, a greater percentage tested positive for alcohol (30.5%) than marijuana (20.2%). However, the differences in alcohol use and marijuana use among the other fatally injured drivers were not as pronounced. For example, 26.0% of fatally injured motorcyclists tested positive for alcohol compared to 25.1% who tested positive for marijuana. While only 9.4% of fatally injured drivers of commercial vehicles tested positive for marijuana, this was close to the 10.4% of those drivers who tested positive for alcohol.

Figure 7: Percentage of fatally injured drivers who tested positive for marijuana and alcohol by vehicle type, Canada, 2011-2015



A comparison of the percentage of fatally injured drivers testing positive for marijuana and alcohol among drivers travelling alone as opposed to those travelling with passengers is shown in Figure 8. Approximately 50% more fatally injured drivers who were travelling alone tested positive for alcohol (32.0%) than marijuana (19.5%). An almost identical proportion is found among fatally injured drivers who were travelling with passengers as 30.7% of these drivers tested positive for alcohol and 19.6% tested positive for marijuana.

Figure 8: Percentage of fatally injured drivers who tested positive for marijuana and alcohol by presence of passengers, Canada, 2011-2015



Conclusions

In the past 16 years, the percentage of fatally injured drivers in Canada who tested positive for marijuana has generally increased. Historically, drivers aged 16 to 19 years were the age group of fatally injured drivers who were most likely to test positive for marijuana. However, since 2014, a larger percentage of fatally injured drivers aged 20 to 34 years has tested positive for marijuana. Continued monitoring of the presence of marijuana in fatally injured drivers by age is required.

Fatally injured male drivers were almost twice as likely to test positive for marijuana than fatally injured female drivers. While driver sex may explain differences in the magnitude of marijuana use among fatally injured drivers, it does not appear to account for differences in trends from 2000 to 2015.

Between 2000 and 2015, a larger percentage of fatally injured drivers tested positive for alcohol than for marijuana. Between 2010 and 2013, the percentage of alcohol-positive drivers decreased while the percentage of marijuana-positive drivers increased. In the past two years, however, trends in the prevalence of these substances appear to be similar.

As reported in previous years, almost one-third of fatally injured drivers aged 16 to 19 years tested positive for marijuana and the percentage of drivers aged 20 to 34 years who tested positive was almost as large. Although marijuana use was not as prevalent among .fatally injured drivers aged 35 to 49 years, it was still the most commonly found drug. Education programs that have been developed to reduce marijuana use among drivers aged 16 to 19 years may also be appropriate to address marijuana-impaired driving among groups aged 20 to 34 and 35 to 49 years.

On the other hand, fatally injured drivers aged 50 to 64 and 65 and older were more likely to test positive for CNS depressants and narcotic analgesics. Continued monitoring of trends is needed to track whether the prevalence of marijuana use will increase across all age categories. Furthermore, a 'one size fits all' approach to reduce any kind of drug-impaired driving among all age groups may not resonate equally throughout the driving population.

As expected, fatally injured drivers were more likely to test positive for alcohol than marijuana, particularly among drivers of automobiles and light trucks/vans. Although recent data show that fatally injured motorcyclists and commercial vehicle drivers were almost as likely to test positive for marijuana as they did for alcohol, it should be considered that there are fewer drivers of these types of vehicles. It would appear that both marijuana and alcohol use among drivers is not dependent upon whether these drivers are travelling alone or with passengers. Further monitoring of marijuana use among fatally injured drivers based on vehicle type and the presence or absence of passengers is recommended.

References

Brown, S.B., Vanlaar, W.G.M., Robertson, R.G. (2017). The Alcohol and Drug-Crash Problem in Canada 2014 Report. Ottawa, ON.: Canadian Council of Motor Transport Administrators.

Grondel, D. (2016). Driver Toxicology Testing and the Involvement of Marijuana in Fatal Crashes, 2010-2014: A Descriptive Report. Olympia, WA.: Washington Traffic Safety Commission.

Jonah, B. (2012). Drugs and Driving Framework. Ottawa, ON.: Canadian Council of Motor Transport Administrators.

Robertson, R.D., Mainegra Hing, M., Pashley, C.R., Brown, S.W., Vanlaar, W.G.M. (2017). Prevalence and trends of drugged driving in Canada. Accident Analysis and Prevention, 99: 236-241.

Traffic Injury Research Foundation (2017). Marijuana Use Among Drivers in Canada, 2000-2014. Ottawa, ON.: Traffic Injury Research Foundation.

[1] Fatality data from British Columbia from 2011 to 2015 were not available at the time that this fact sheet was prepared. As a result, Canadian data presented have been re-calculated to exclude this jurisdiction and make equitable comparisons.

Traffic Injury Research Foundation

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

Traffic Injury Research Foundation (TIRF)
171 Nepean Street, Suite 200
Ottawa, Ontario K2P 0B4
Phone: (877) 238-5235
Fax: (613) 238-5292
Email: tirf@tirf.ca
Website: www.tirf.ca

ISBN: 978-1-988945-67-5

Acknowledgements

Production of this fact sheet was made possible through the sponsorship of Desjardins Insurance. Data used in this fact sheet come from TIRF's National Fatality Database, which is also maintained with funding from Desjardins Insurance.

Desjardins Insurance

Sign-up today at www.tirf.ca to receive announcements, updates and releases.