Drug & Fatigue-Related Fatal Collisions in Canada | 2000-2018

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Traffic Injury Research Foundation, November 2021

In recent years, a greater percentage of fatally injured drivers have tested positive for drugs than alcohol in Canada. While some of this growth may be due to improvements in data collection, dealing with drugged driving has become more of a priority in road safety planning (Brown et al. 2021). Different drugs may adversely affect driving skills in distinct ways. For example, a driver under the influence of central nervous system stimulants may exhibit more aggressive and risky behaviour behind the wheel (MacDonald et al. 2008) while cannabis may compromise a driver's ability to stay within one's lane and adversely affect reaction time (Hart et al. 2001).

Fatigue-related driving has not been as prevalent as drugged driving. Some characteristics of fatigued drivers are similar to those of drinking drivers. These include uneven braking, fewer mirror checks for other vehicles, erratic speed and failing to stay in one's lane. Being awake for 18 hours can result in impairment approximately equal to a blood alcohol concentration (BAC) of .05 (50 milligrams of alcohol in 100 millilitres of blood). Furthermore, it is difficult for an extremely fatigued individual to anticipate when they will fall asleep (Brown 1994, Vanlaar et al. 2008, Bowman & Barrett 2021).

This fact sheet, sponsored by Desjardins, examines the magnitude and trends regarding the role of drugs and fatigue in motor vehicle fatalities in Canada from 2000 to 2018. Data from TIRF's National Fatality Database were used to prepare this fact sheet which explores trends in the role of drug use and fatigue among fatally injured victims as well as compares fatally injured drug-positive and fatigued drivers. Other topics examined include characteristics of drug-related and fatigue-related crashes resulting in fatalities such as time of day, time of week, and the number of vehicle occupants. Comparisons between the two types of victims are also made.

A fatality is defined as drug-related if at least one of the drivers in the crash (either dying or surviving) was considered to be positive for drugs (including illicit drugs, prescription drugs, and over-the-counter drugs). This is based, in order of importance, upon toxicological data from the coroner or medical examiner, police-reported collision data, and coroner/medical examiner narrative information. A fatally injured fatigued driver is a person who dies in a collision and was considered

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to have been fatigued just prior to, or during, the collision. Since fatigue cannot be quantified, its presence is based primarily upon police-reported collision data and, to a lesser degree, narrative information from the coroner or medical examiner. In this fact sheet, TIRF's reporting upon the role of driver drug use and driver fatigue refer to their presence and does not necessarily mean that either drugs or fatigue were the primary or sole causes of the collision.

Prevalence of drug-related and fatigue-related fatalities

The number of drug-related and fatigue-related fatalities in Canada between 2000 and 2018 is shown in Figure 1. Drug-related fatalities are represented by the solid line and plotted against the axis on the left while fatigue-related fatalities are represented by the vertical bars and plotted against the axis on the right. During this 19-year period, the number of drug-related fatalities generally increased from 266 in 2000 to a high of 551 in 2018. On the other hand, the number of fatigue-related fatalities rose from 138 in 2000 to 159 in 2004 before falling to a low of 81 in 2018. The rise of drug-related fatalities is in contrast to the decline in fatigue-related fatalities, particularly since 2004.

Drug-related and fatigue-related fatalities from 2000 to 2018 were regrouped into three categories. These include cases in which:

- The person killed was the driver who was affected by the contributing factor (*drug-positive driver/fatigued driver*);

Figure 1: Drug-related and fatigue-related fatalities - Canada, 2000-2018

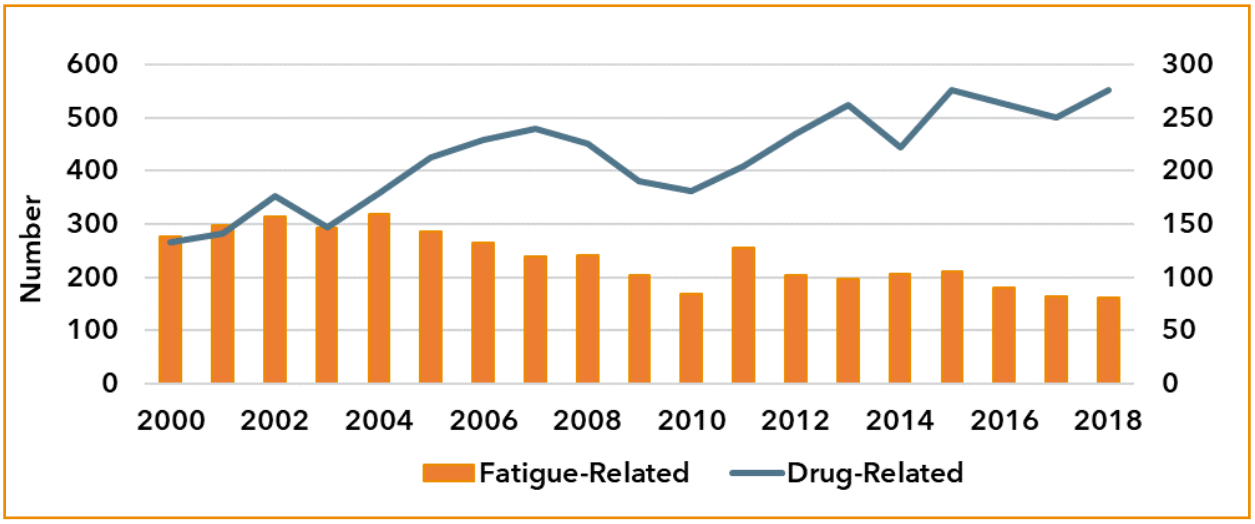


Figure 2: Number of drug-related fatalities by victim category - Canada, 2000-2018

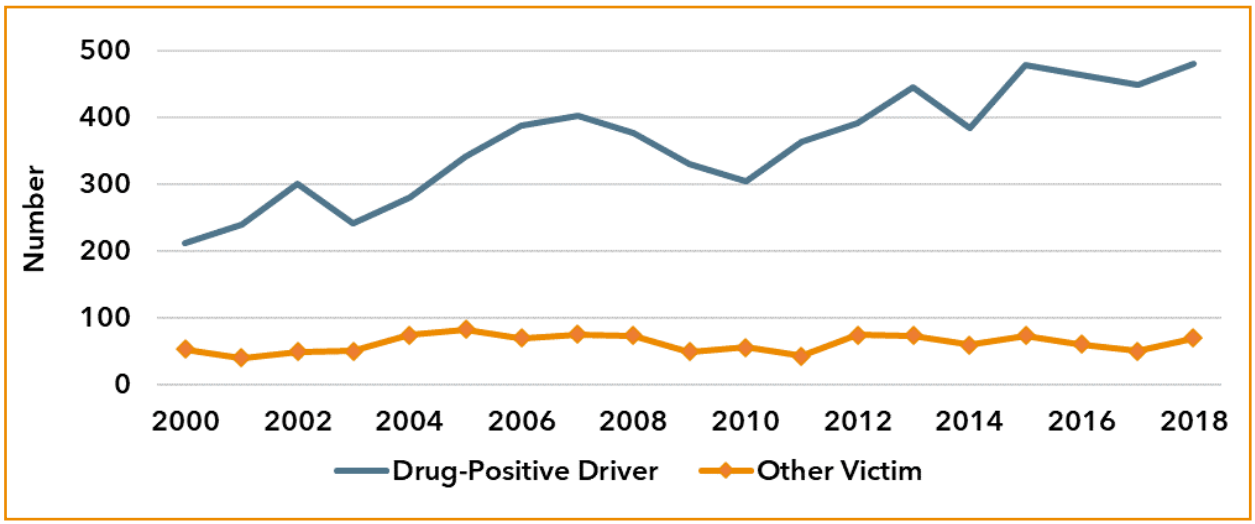
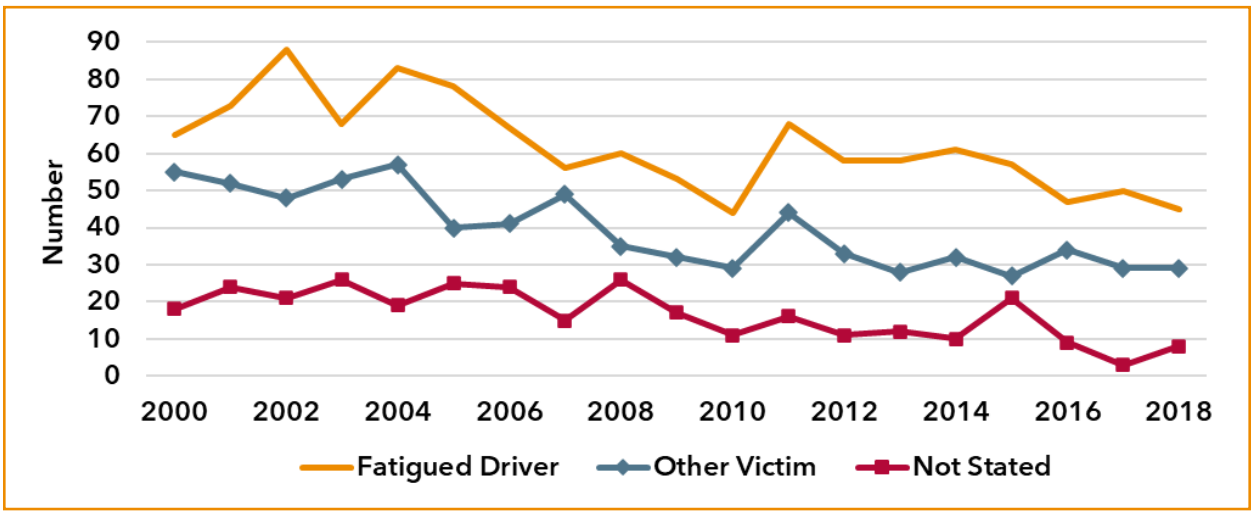


Figure 3: Number of fatigue-related fatalities by category - Canada, 2000-2018



- The person killed was not the driver affected by the contributing factor (*other victim*). These victims include unaffected drivers colliding with a vehicle driven by an affected driver, passengers dying in a crash where at least one of the drivers was affected, or pedestrians who were struck by an affected driver; or,
- It cannot be determined which driver was affected by the contributing factor nor which person in the vehicle was the driver who was affected (*not stated*).

In Figure 2, it can be seen that most drug-related fatalities were fatally injured drivers who were positive for drugs. The number of fatalities in which the fatally injured driver was positive for drugs increased from 212 in 2000 to a high of 481 in 2018. Meanwhile, 54 drug-related fatalities in 2000 were other victims, struck by an affected – surviving – driver, peaking at 83 in 2005, before stabilizing at 70 in 2018. Since there were only 12 drug-related fatalities in the *not stated* category, this group of victims is not included in the figure.

The number of fatigue-related fatalities from 2000 to 2018 is shown in Figure 3. Throughout the entire 19-year period, most fatigue-related fatalities occurred in crashes in which the fatally injured driver was fatigued. The number of fatalities in which the fatally injured driver was fatigued rose from 65 in 2000 to a high of 88 in 2002 before eventually decreasing to 45 in 2018. In 2000, 55 fatigue-related fatalities were other victims, struck by an affected – surviving – driver, increasing to 57 in 2004, before decreasing to 29 in 2018. The number of fatalities in which the fatigued driver could not be determined gradually rose from 18 in 2000 to 26 in 2008, then declined to only eight in 2018. This could be due, in part, to more complete data in recent years that indicate the role of fatigue by specific drivers.

In Figure 4, trends in drug-related fatalities and fatigue-related fatalities are compared with two other notable contributing collision factors – alcohol and distraction. The percentage of fatalities that are drug-related has risen steadily from 10.5% in 2000 to 30.9% in 2018. During this 19-year period, there has also been a noticeable, albeit

Figure 4: Percentage of total fatalities related to various contributing factors - Canada, 2000-2018

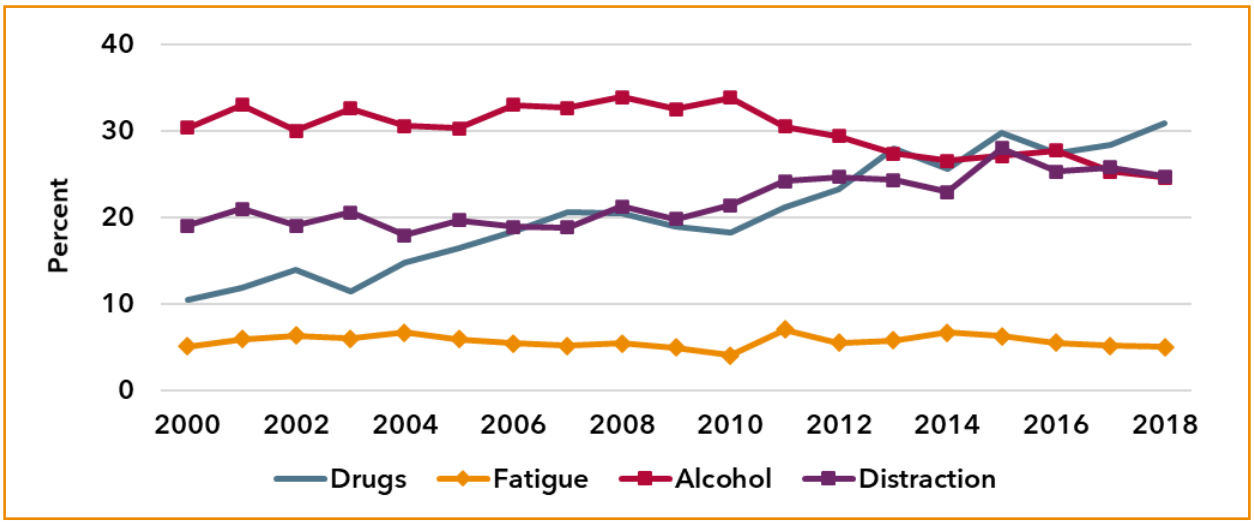
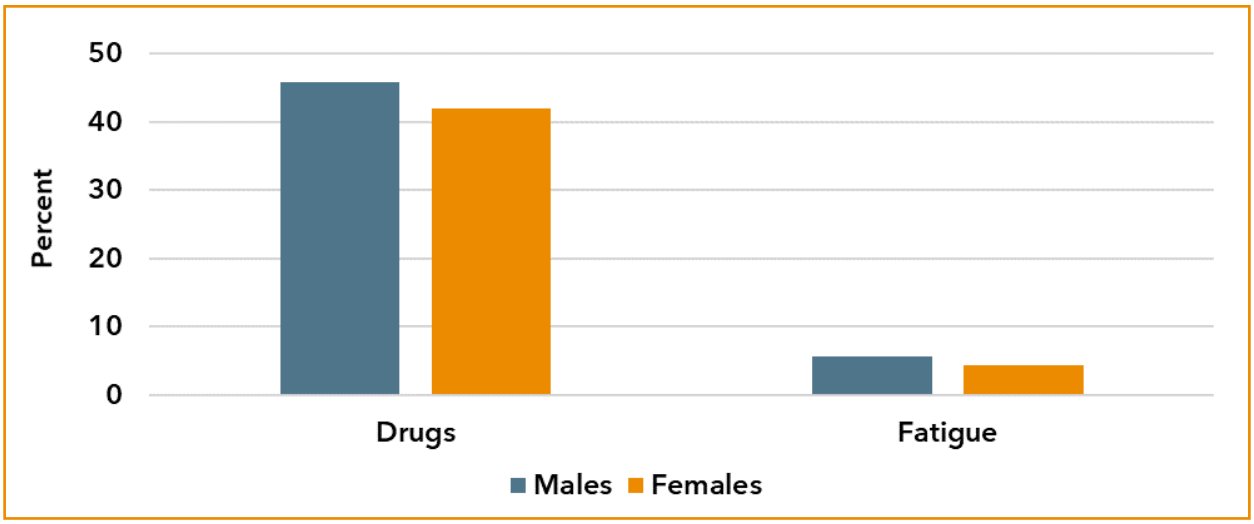


Figure 5: Percentage of fatally injured drug-positive and fatigued drivers by sex - Canada, 2014-2018



more modest, increase in distraction-related fatalities from 19.1% in 2000 to 24.8% in 2018. By comparison, fatigue-related fatalities have remained steady, rising from 5.1% in 2000 to 7.0% in 2011, before returning to 5.0% in 2018. Of the four contributing factors, alcohol-related fatalities have been the most common during most of the 19-year period. However, there has been a gradual decrease in alcohol-related fatalities from 30.4% in 2000 to 24.6% in 2018. As a result, from 2014 to 2018, there has been a convergence in the percentage of fatalities involving alcohol and distraction while the percentage of drug-related fatalities has risen.

Characteristics of Fatally Injured Drivers Who Were Positive for Drugs or Fatigued

This section examines the demographic characteristics of fatally injured drivers to gauge any variation in terms of drug use or fatigue based on driver sex, age group, and vehicle type. Additional focus is given to fatally injured fatigued drivers to examine additional contributing factors as well as categories of drugs consumed. The results are based on data from five years (2014 to 2018) for fatally injured drivers in highway collisions.

Figure 5 shows 45.9% of fatally injured male drivers were positive for drugs compared to 42.0% of fatally injured female drivers. Fatally injured male drivers were also more likely to be fatigued than fatally injured female drivers (5.6% and 4.4%, respectively).

The age of fatally injured drivers has been re-grouped into the following age groups (16-19, 20-24, 25-34, 35-44, 45-54, 55-64, and 65+ years). The percentage of fatally injured drivers in each age group who tested positive for drugs is shown in Figure 6. Drivers aged 25-34 (51.7%) were the most likely to have tested positive for drugs.

Conversely, 37.8% of fatally injured drivers aged 65 and older tested positive for drugs. It should be noted that fatally injured drivers in this age group are more likely to test positive for CNS depressants while younger drivers are more likely to test positive for cannabis (Brown et al. 2021).

The percentage of fatally injured drivers in each age group who were fatigued is shown in Figure 7. Drivers aged 65 and older (6.7%) were the most likely to have been fatigued. Conversely, 4.3% of fatally injured drivers aged 45-54 were fatigued.

Figure 6: Percentage of fatally injured drivers positive for drugs by age group - Canada, 2014-2018

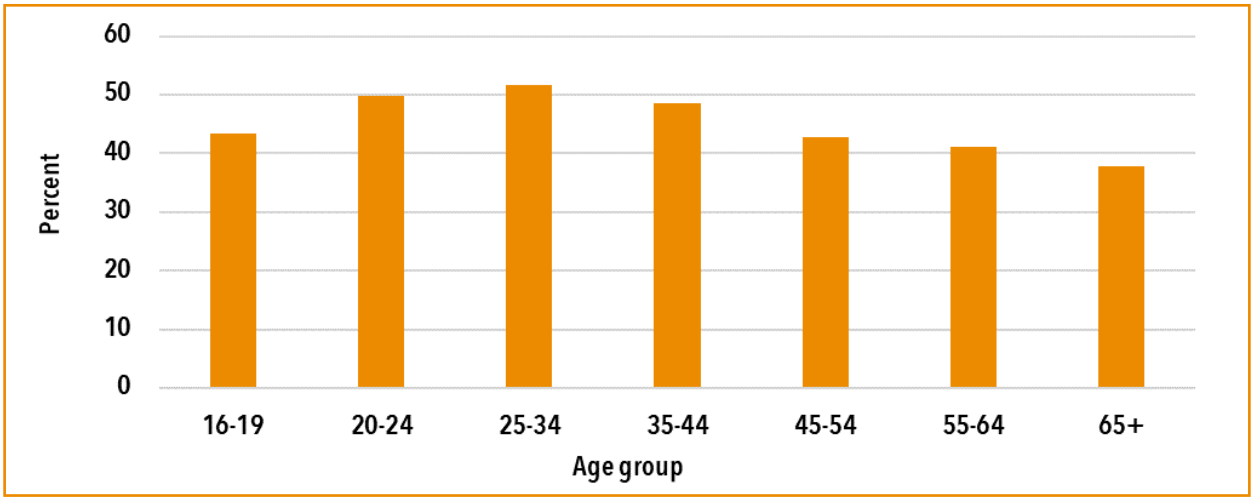


Figure 7: Percentage of fatally injured fatigued drivers by age group - Canada, 2014-2018

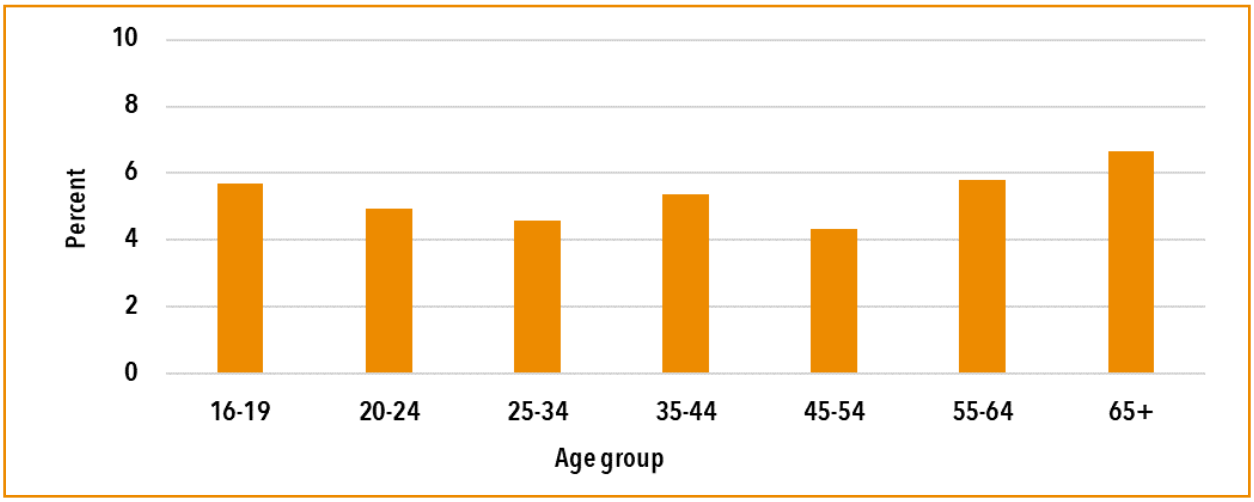


Figure 8: Percentage of fatally injured drivers drug-positive or fatigued by vehicle type - Canada, 2014-2018

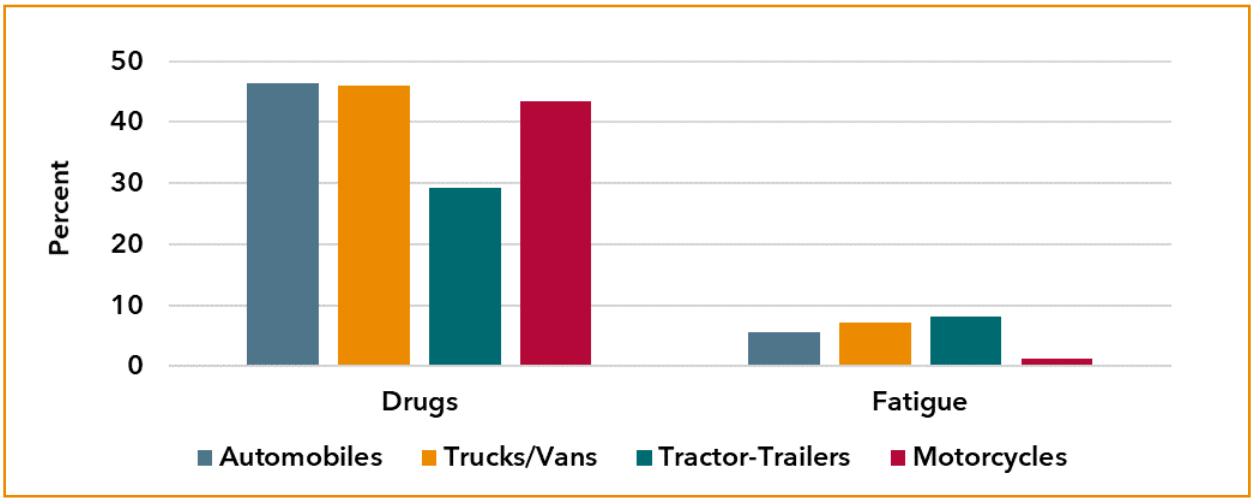


Figure 9: Percent of fatally injured fatigued drivers with other contributing factors - Canada, 2014-2018

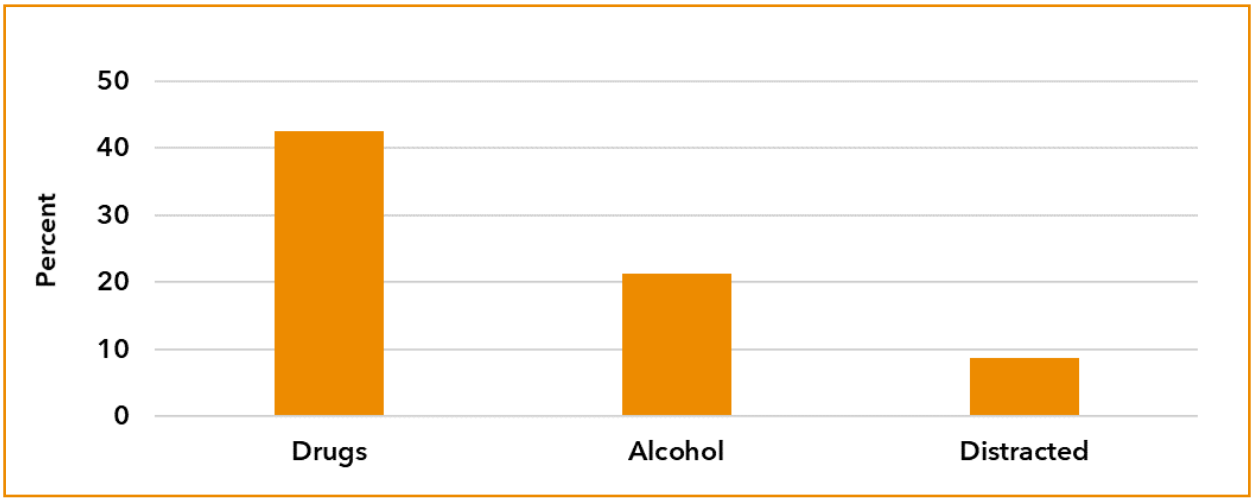


Figure 10: Percentage of fatally injured fatigued drivers testing positive for various categories of drugs - Canada, 2014-2018

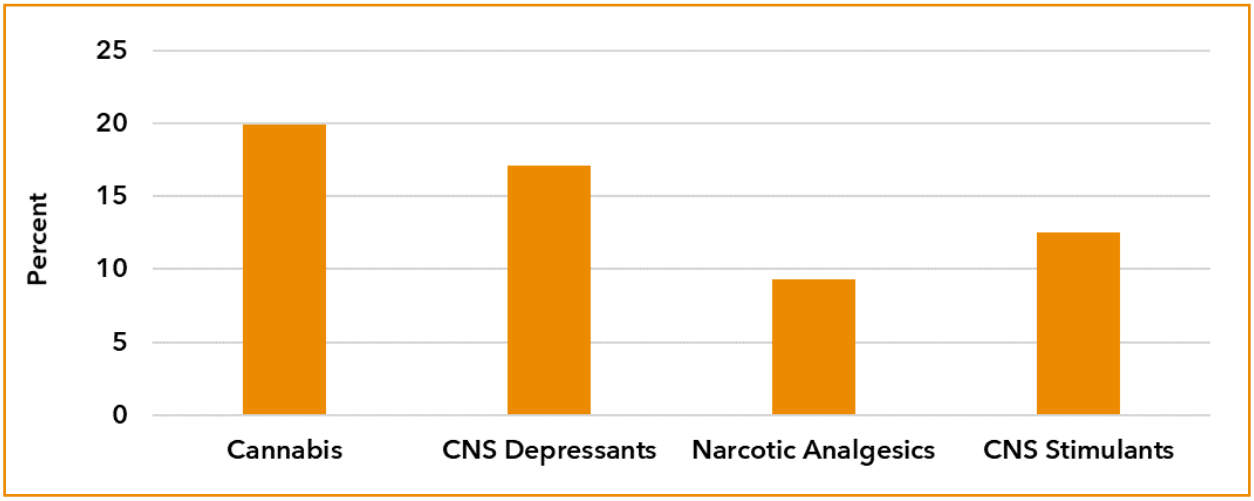
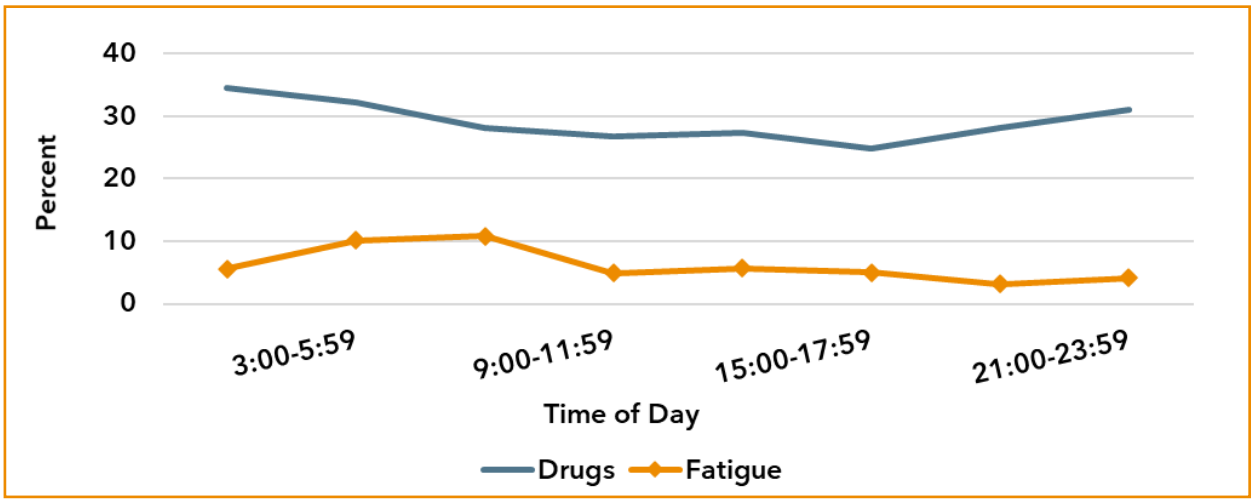


Figure 11: Percentage of fatalities drug-related or fatigue-related by time of day - Canada, 2014-2018



The prevalence of drug use and fatigue among fatally injured drivers of different vehicle types is shown in Figure 8. Fatally injured drivers of trucks/vans (46.0%) and automobiles (46.3%) were the most likely to test positive for drugs compared to 43.4% of motorcyclists and only 29.3% of tractor-trailer drivers. However, fatally injured tractor-trailer drivers were the most likely to be fatigued (8.2%) compared to only 1.3% of motorcyclists.

The prevalence of other contributing factors (drug use, alcohol use, and distraction) among fatally injured fatigued drivers is shown in Figure 9. As can be seen, the most common accompanying contributing factor among fatally injured fatigued drivers was drug use (42.6%) followed by alcohol use (21.3%), and distraction (8.7%).

Figure 10 shows the categories of drugs most frequently found in toxicological samples taken from fatally injured fatigued drivers. Among this subset of drivers, 19.9% tested positive for cannabis, 17.1% tested positive for central nervous system (CNS) depressants, 12.5% were positive for CNS stimulants, and 9.3% were positive for narcotic analgesics.

Collision Characteristics of Drug- and Fatigue-Related Fatalities

This section examines characteristics of drug-related and fatigue-related fatal crashes. These characteristics include time of day the crash occurred, time of week, season, and the number of vehicle occupants for fatal collisions during the 2014-2018 time period.

The percentage of fatalities that were drug-related or fatigue-related by time of day is presented in Figure 11. The time of day has been re-grouped into three-hour increments (e.g., midnight to 2:59 am). The time of day with the

Figure 12: Percentage of fatalities drug-related or fatigue-related during weekdays and weekends - Canada, 2014-2018

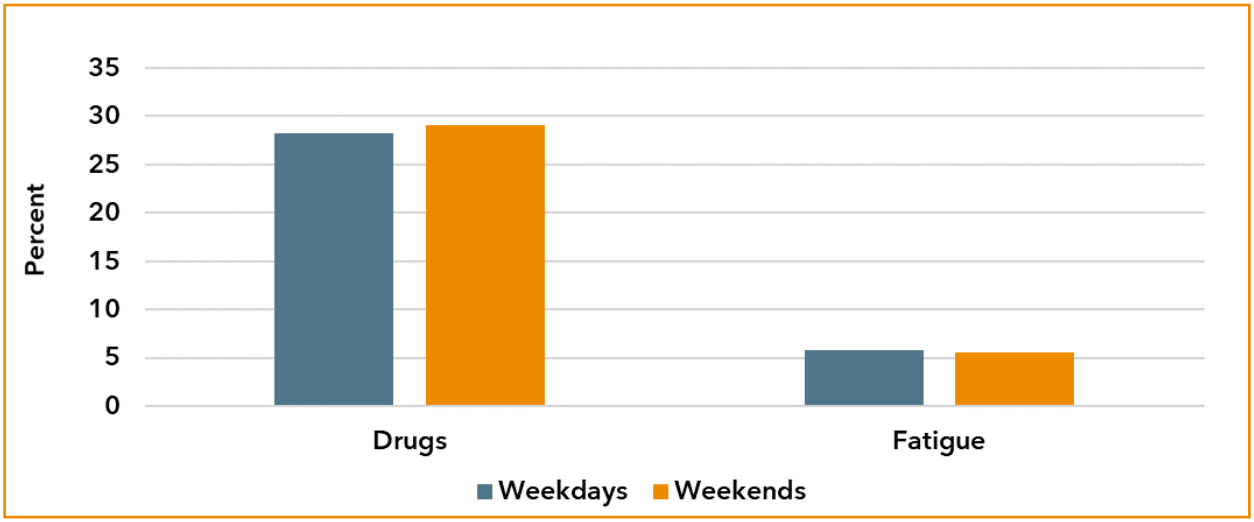


Figure 13: Percentage of fatalities drug- and fatigue-related by season - Canada, 2014-2018

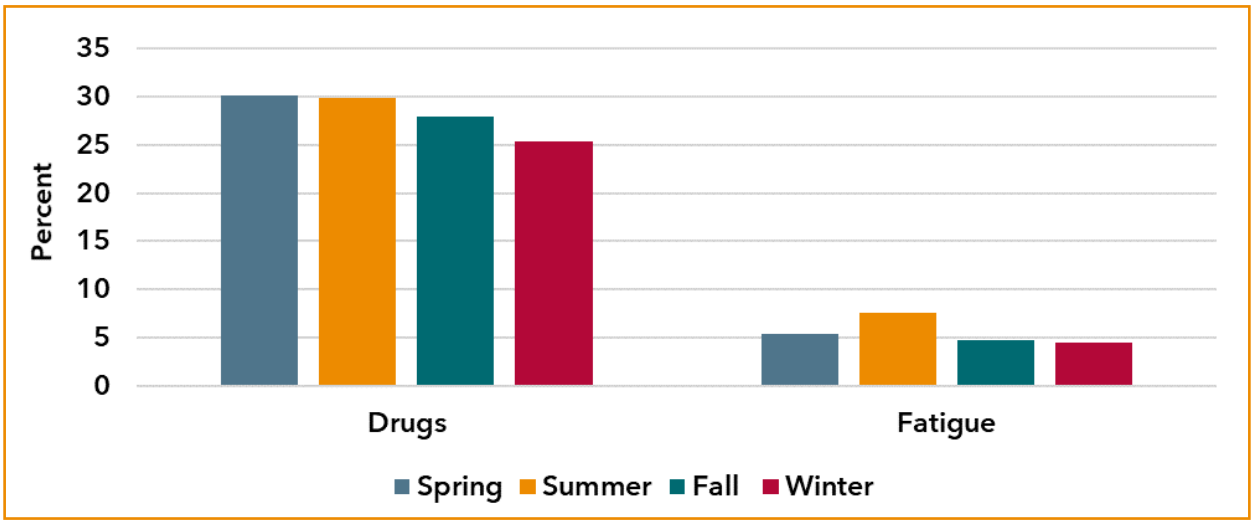
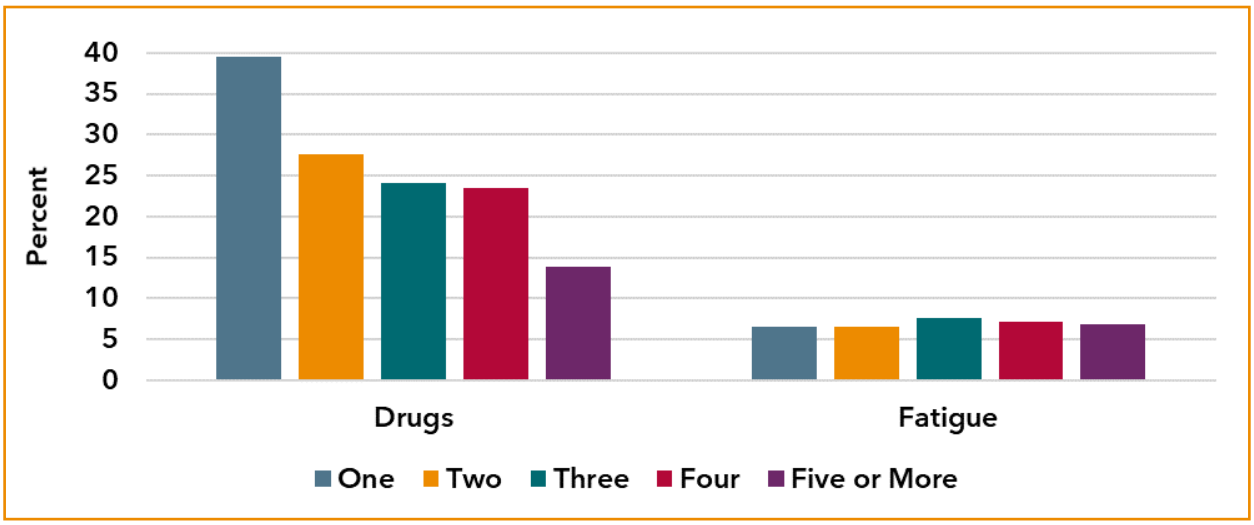


Figure 14: Percentage of fatalities drug-related and fatigue-related by number of occupants - Canada, 2014-2018



highest percentage of drug-related fatalities occurred between midnight and 2:59 am (34.5%) while the lowest percentage of drug-related fatalities occurred between 3:00 pm and 5:59 pm (24.8%). For fatigue-related fatalities, the highest percentage was found among crashes which occurred between 6 am and 8:59 am (10.9%) while only 3.1% of fatalities in crashes occurring between 6 pm and 8:59 pm were fatigue-related.

Figure 12 shows the percentage of fatalities that were drug-related and fatigue-related according to the time of the week when the collision occurred. Collisions have been aggregated into weekdays (from 6 pm on Sunday to 5:59 pm on Friday) and weekends (from 6 pm on Friday to 5:59 pm on Sunday). The percentage of fatalities that were drug-related were slightly higher for weekend crashes than weekday crashes (29.1% versus 28.2%). A higher percentage of weekday crashes (5.8%) were fatigue-related as opposed to crashes occurring on weekends (5.5%).

Seasonal variations in the percentage of fatalities that are drug-related or fatigue-related are presented in Figure 13. A lower percentage of drug-related fatalities occurred in the Winter (25.4%) than in the other three seasons, most notably the Spring (30.1%). Similarly, the lowest percentage of fatigue-related fatalities occurred in Winter crashes (4.5%) while the highest percentage occurred in Summer crashes (7.6%).

In Figure 14, the percentage of fatalities that are drug-related or fatigue-related are compared based upon the number of occupants in the deceased person's vehicle. The highest percentage of drug-related fatalities was found in vehicles with one occupant (39.5%) compared to only 13.9% among vehicles with five or more occupants. Vehicles with three or four occupants had a higher percentage of fatigue-related fatalities (7.6% and 7.1%, respectively) than vehicles with one or two occupants (6.6% and 6.5%, respectively).

Conclusions

According to TIRF's National Fatality Database, there was an upward trend in the number of drug-related fatalities in Canada between 2000 and 2018. However, there was a downward trend for fatalities where fatigue was a contributing factor during this same 19-year period. For both drug-related and fatigue-related crashes, the majority of victims were fatally injured drivers who were identified as being positive for these factors. This is similar to alcohol-related fatalities where most persons killed were the fatally injured drinking driver.

Among fatally injured drivers, a higher percentage of males tested positive for drugs than females. Similarly, a higher percentage of males were fatigued. Fatally injured drivers aged 25-34 were the most likely to be positive for drugs and there is a progressive decrease among older age groups. Yet fatally injured drivers aged 65 and older were the most likely to be fatigued.

While fatally injured tractor-trailer drivers tested for drugs less frequently than drivers of other types of vehicles, tractor-trailer drivers were the most likely to be fatigued. Admittedly, tractor-trailer drivers represent a smaller segment of vehicles on the road; regardless, they may be more prone to fatigue since they generally travel greater distances and drive more often at night.

When looking specifically at fatally injured fatigued drivers as a subset, more tested positive for drugs than alcohol. An even smaller percentage of these drivers was considered to be distracted. And among fatally injured fatigued drivers testing positive for drugs, cannabis was the drug category used most frequently.

Drug-related fatal collisions most frequently occurred between midnight and 6 am. As earlier data from TIRF's National Fatality Database and research literature has shown (Brown et al. 2020a), fatigue-related fatal collisions occur more frequently in the early morning. For both drug-related and fatigue-related crashes, there was little variability in the percentage of drivers dying in crashes that occurred on weekdays compared to weekend crashes. Spring was the most common season for drug-related fatal collisions while fatigue-related crashes were most likely to occur in the Summer.

The percentage of drug-related fatalities declined with an increasing number of vehicle occupants. Perhaps drivers carrying passengers felt a greater sense of responsibility. Drivers with three or four occupants were more likely to be involved in fatigue-related crashes than those with a lower or higher number of occupants. This characteristic may require further monitoring since it would be expected that passengers can keep drivers engaged in conversation or vehicle occupants can take turns driving on a long trip. It suggests education not only for drivers but also their passengers may be effective.

In the past, there were limitations associated with the reporting of the role of drugs in collisions in general and fatal collisions in particular. More recently, testing rates for drug use among fatally injured drivers have increased, particularly in the past decade. Furthermore, police-reported collision data have reported drug use among surviving drivers more routinely. It should also be noted that as more police officers receive drug recognition expert (DRE) training, drug use among surviving drivers may be documented more frequently.

There are still some limitations associated with the reporting of the role of fatigue in collisions in general and fatal collisions in particular. Under-reporting of the role of fatigue can be due to a lack of firm evidence, the reluctance of surviving drivers to acknowledge they were tired, and the presence of alcohol in a fatally injured driver which may result in investigating officers indicating alcohol as the prime contributing factor in a collision report, at the expense of either drugs or fatigue. However, it has also been argued the role of fatigue can be over-reported in collisions since it is not considered to be as socially unacceptable as alcohol use, drug use, speeding, or distraction (NHTSA 2011).

In conclusion, data show there has been an increase in drug-related road traffic fatalities since 2000. While the decrease observed in fatigue-related road traffic fatalities may be encouraging, it is actually non-existing when expressed as a proportion of all fatalities. In terms of magnitude, drugged driving certainly surpasses fatigued driving in this regard. Nevertheless, the data revealed interesting differences between drugged driving and fatigued driving fatal crashes that can help identify pathways to successful intervention for both. Furthermore, it is possible that greater gains could be made when adopting effective interventions for fatigued driving relative to drugged driving. Hence, the sole fact that fatigued driving appears to be the smaller problem must not serve as a reason to divest resources away from the issue. Instead, evidence-informed decisions should be based on where to invest and prioritize to work toward Vision Zero, i.e., no fatal and serious injuries on our roads and making sure people get home safely. Resources to adopt this approach are freely available at **action2zero.tirf.ca**

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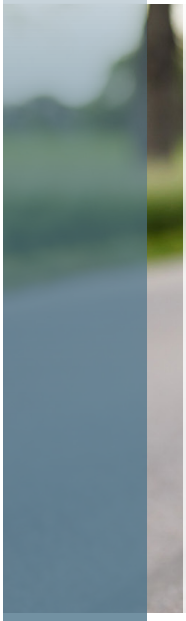
Fatality Database Disclaimer

Data from TIRF's National Fatality Database may be subject to change as the closure of cases is ongoing. As such, there may be minor differences in this document compared to previous documents reporting on the same topic.



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The vision of the Traffic Injury Research Foundation (TIRF) is to ensure people using roads make it home safely every day by eliminating road deaths, serious injuries and their social costs. TIRF's mission is to be the knowledge source for safer road users and a world leader in research, program and policy development, evaluation, and knowledge transfer. TIRF is a registered charity and depends on grants, awards, and donations to provide services for the public. Visit www.tirf.ca.

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