FATIGUE-RELATED FATAL COLLISIONS IN CANADA, 2000-2013

Traffic Injury Research Foundation, October 2016

Introduction

Fatigue is a significant factor in motor vehicle collisions across Canada. Behaviours associated with fatigued driving that can increase crash risk include inconsistent speed, frequent lane changes or weaving, not respecting road signs and other traffic control devices, sudden braking, and speeding (Robertson et al. 2009). In a survey of Canadian motorists in 2011, 18.5% of respondents admitted that they had fallen asleep or nodded off while driving in the past year (Marcoux et al. 2012).

This fact sheet, sponsored by Desjardins Insurance, summarizes the characteristics of fatally injured victims involved in fatigue-related collisions in Canada from 2000 to 2013. Data for this fact sheet are derived from TIRF's National Fatality Database which is jointly funded by the Public Health Agency of Canada and Desjardins Insurance. Fatality data from British Columbia from 2011 to 2013 were not available at the time this fact sheet was prepared. As a result, Canadian data presented have been re-calculated to exclude this jurisdiction and make equitable comparisons.

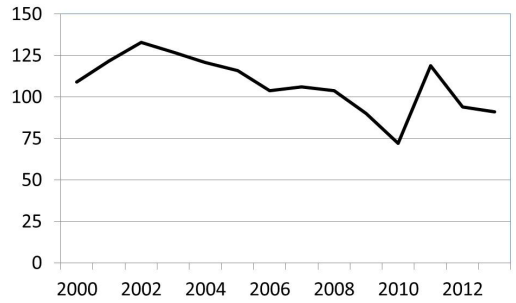
The objective of this fact sheet is to provide a review of the magnitude and trends of fatigue-related motor vehicle crashes in Canada using indicators such as driver age and sex, vehicle type, alcohol and drug use, time of crash and number of occupants. Fatigue-related crashes are defined as those in which either police-reported collision data or coroner/medical examiner information cites fatigue as a factor for one of the parties involved in the collision. Fatigue-related fatalities have been differentiated in this fact sheet by victim type. These victim types are:

- Fatally injured drivers who were fatigued;
- Passengers, pedestrians and occupants of other vehicles who were struck by a fatigued driver who survived; and,
- Victims in crashes where the police-reported collision data did not specify which driver was fatigued or where it was not possible to determine which of the occupants was driving.

Trends in fatigue-related fatalities

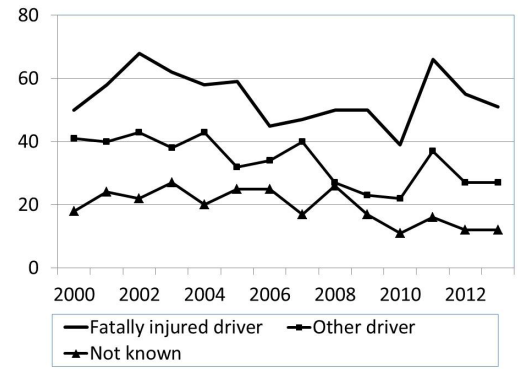
The total number of fatigue-related fatalities from 2000 to 2013 is shown in Figure 1. These data included all victim types of fatigue-related fatalities that were described above. The number of fatigue-related fatalities in Canada rose from 109 to 133 between 2000 and 2002, and generally decreased to 72 in 2010. There were 91 fatigue-related fatalities in 2013.

Figure 1: Fatigue-related fatalities, Canada, 2000-2013



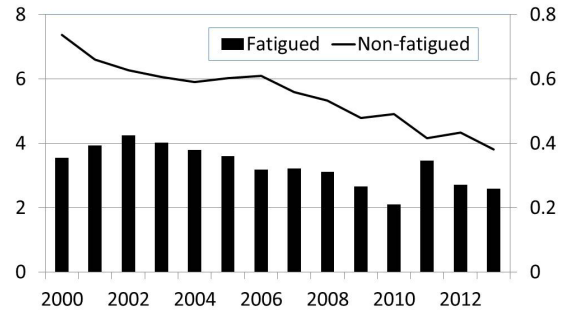
The number of fatigue-related fatalities in Canada by victim type from 2000 to 2013 is shown in Figure 2. Fatally injured drivers have represented half of the fatigue-related fatalities during this period. There were 50 of these cases in 2000. The number decreased to a low of 39 in 2010, then reached 51 in 2013. The number of passengers, pedestrians and occupants of other vehicles who were killed by a fatigued driver generally decreased from 41 in 2000 to 22 in 2010, and stabilized at 27 fatalities in 2013. Lastly, the number of fatigue-related fatalities in which the fatigue-related driver was undetermined rose from 18 to 27 between 2000 and 2003, then decreased to 12 in 2013.

Figure 2: Fatigue-related fatalities by victim types, Canada, 2000-2013



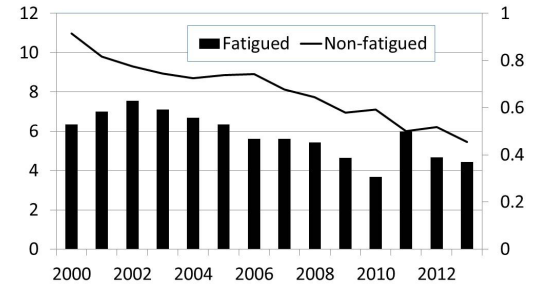
The rate per 100,000 population for both fatigue and non-fatigue-related fatalities in Canada from 2000 to 2013 is shown in Figure 3. The rate of fatigue-related fatalities between 2000 and 2002 rose from .36 persons per 100,000 population to a peak of .42, steadily decreased to .21 in 2010 and rose to .26 in 2013. Non-fatigue-related fatalities per 100,000 population have decreased from 7.4 persons to 3.82 in 2013. There were decreases in the ratio of both fatigue and non-fatigue-related fatalities from 2002 to 2010. In 2011, the ratio of fatigue-related fatalities increased sharply, then decreased until 2013. However, for non-fatigue-related fatalities the ratio continued to decrease between 2000 and 2013. The ratio of fatigue related fatalities per 100,000 population has not decreased as steadily as the ratio of non-fatigue related fatalities.

Figure 3: Fatigue and non-fatigue related fatalities per 100,000 population, Canada, 2000-2013



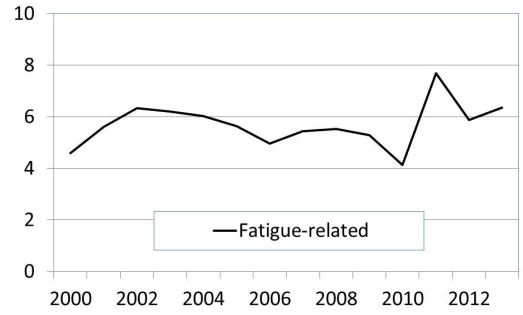
Another means of comparing fatigue and non-fatigue-related fatalities is to base the fatality rate on the number of licensed drivers. The rate of fatalities in both fatigue and non-fatigue-related fatalities per 100,000 licensed drivers from 2000 to 2013 is shown in Figure 4. The ratio of fatigue-related fatalities per 100,000 licensed drivers decreased from 0.53 persons in 2000 to a low of 0.31 in 2010, and rose again to 0.37 in 2013. In comparison, the ratio of non-fatigue-related fatalities per 100,000 licensed drivers decreased from 11.0 persons in 2000 to 5.45 in 2013. Similar to Figure 3, there was a decrease in both fatigue and non-fatigue-related fatalities between 2002 and 2010. Once again, in 2011, there was a sharp increase in the ratio of fatigue-related fatalities.

Figure 4: Fatigue and non-fatigue related fatalities per 100,000 licensed drivers, Canada, 2000-2013



The prevalence of the role of fatigue in motor vehicle fatalities from 2000 to 2013 is shown in Figure 5. Overall, the percentage of fatalities that were fatigue-related is relatively low. However, it is worth noting that the role of fatigue in fatal crashes is difficult to determine if there are no eyewitnesses or if other contributing factors (e.g., alcohol, drugs) take precedence in police reports. In 2000, 4.6% of fatalities were fatigue-related compared to 2013 where 6.4% of all fatalities were fatigue-related.

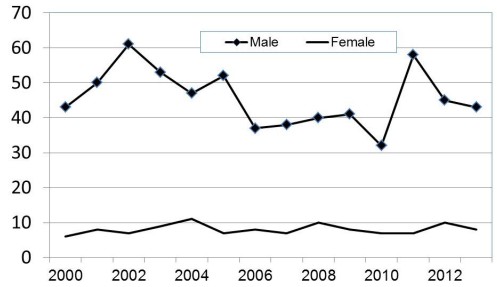
Figure 5: Percentage of total fatalities that were fatigue-related, Canada, 2000-2013



Characteristics of fatally injured drivers who were fatigued

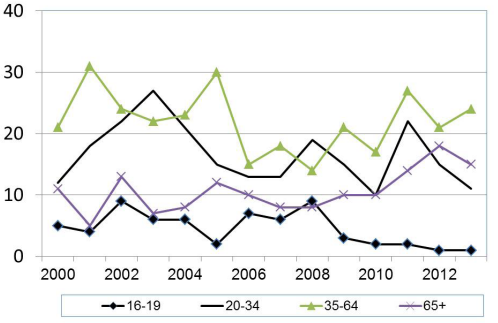
This section examines the characteristics (driver age and sex, vehicle type, alcohol/drug use) of fatally injured drivers in order to determine whether there is any variation among these variables over time. The number of fatally injured male and female drivers who were fatigued from 2000 to 2013 is shown in Figure 6. There have been considerably more fatally injured male drivers than female drivers who were fatigued. Between 2000 and 2002, the number of fatally injured fatigued male drivers rose from 43 to 61, dropped to 32 in 2010, and stabilized at 43 in 2013. During this period, there were fewer fatally injured female drivers who were fatigued. For example, there were only six cases in 2000. More recently, only eight fatally injured female drivers were fatigued in 2013.

Figure 6: Number of fatigued fatally injured drivers by sex of driver, Canada, 2000-2013



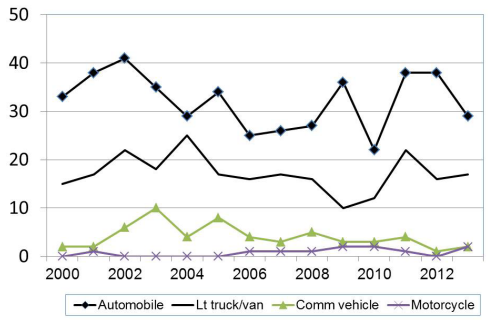
Fatally injured fatigued drivers are divided into four different age groups: 16-19, 20-34, 35-64, and 65+ in Figure 7. The youngest age group, 16-19 year olds, has habitually accounted for the smallest number of fatigued drivers, peaking at nine in 2008 before declining to only one in both 2012 and 2013. Only 12 fatally injured drivers aged 20-34 were fatigued in 2000. This rose to 27 in 2003, then decreased again to 11 in 2013. Fatally injured drivers aged 35-64 represented the largest number of those who were fatigued for 10 of 14 years, including 24 in 2013. Among fatally injured drivers, aged 65 and older, the number of fatigued drivers rose from only five in 2001 to a high of 18 in 2012. In summary, fatigued-related fatalities are more common among drivers aged 35-64. This is to be expected since this age group has more licensed drivers than the other three age groups.

Figure 7: Number of fatigued fatally injured drivers by age group, Canada, 2000-2013



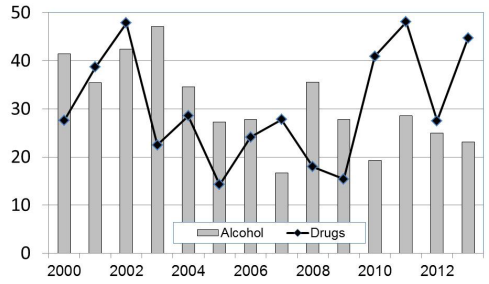
The prevalence of fatigue among fatally injured drivers of different types of highway vehicle from 2000 to 2013 is shown in Figure 8. As expected, automobile drivers represent the largest number of fatally injured fatigued drivers since this is the most common vehicle type. The number of fatally injured fatigued drivers of automobiles peaked in 2002 (41), dropped to 22 in 2010, and reached 29 in 2013. The number of fatally injured fatigued drivers operating light trucks or vans rose to 25 in 2004, decreased to 10 in 2009, and generally rose to 17 in 2013. The number of fatally injured fatigued drivers of commercial vehicles peaked at 10 in 2003, declined to only one in 2012, and increased to two in 2013. Perhaps not surprisingly, very few fatally injured motorcyclists between 2000 and 2013 were considered to be fatigued.

Figure 8: Number of fatally injured drivers who were fatigued by vehicle type, Canada, 2000-2013



In addition to fatigue, other driver conditions may contribute to fatal collisions. The percentage of fatally injured fatigued drivers who tested positive for alcohol and drugs is shown in Figure 9. In 2000, a greater percentage of fatally injured fatigued drivers tested positive for alcohol (41.5%) than drugs (27.6%). Between 2002 and 2006, there was a general decline in the percentage of fatally injured fatigued drivers who tested positive for both of these substances. Since 2010, a larger percentage of fatally injured fatigued drivers have tested positive for drugs than alcohol. For example, in 2013, 44.7% of fatally injured fatigued drivers tested positive for drugs compared to 23.1% who tested positive for alcohol.

Figure 9: Number of fatally injured drivers who tested poitive for alcohol and drugs, Canada, 2000-2013

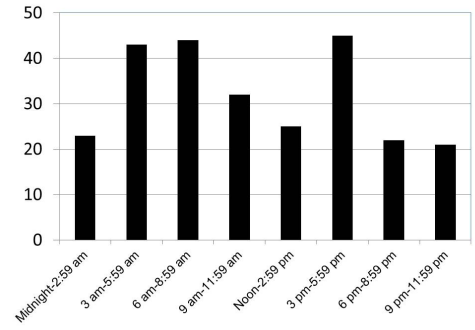


Collision characteristics of fatally injured drivers who were fatigued

This section examines the collision characteristics of fatally injured fatigued drivers in terms of time of day, day of week, season, and number of vehicle occupants for collisions during the past five years (2009-2013).

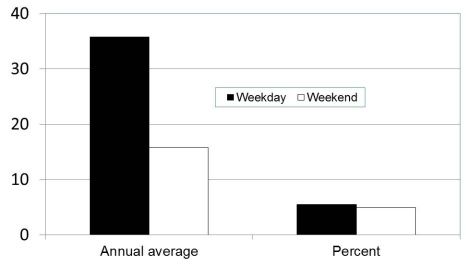
The total number of fatally injured fatigued drivers by time of collision (eight three-hour increments) is shown in Figure 10. As can be seen, the largest number of fatally injured fatigued drivers (45) died in crashes which occurred between 3 p.m. and 5:59 p.m. In addition, 44 fatigued drivers were killed in collisions that occurred between 6 a.m. and 8:59 a.m. and 43 fatigued drivers were killed between 3 a.m. and 5:59 a.m. Generally, fatigue-related fatal crashes more commonly occur in the middle of the night (3 a.m. to 5:59 a.m.) and afternoon (3 p.m. to 5:59 p.m.).

Figure 10: Number of fatally injured drivers who were fatigued by time of collision, Canada, 2009-2013



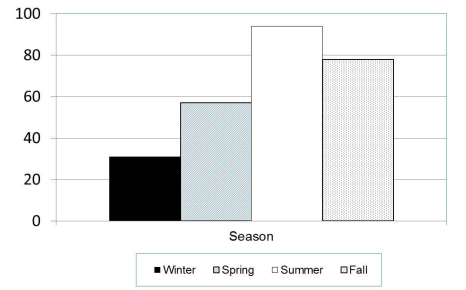
Collisions involving fatally injured fatigued drivers have been regrouped into collisions which occur on the weekend (collisions from 6 p.m. Friday to 5:59 p.m. on Sunday) and those that occur on weekdays (from 6 p.m. Sunday to 5:59 p.m. on Friday). Figure 11 shows, that from 2009 to 2013, an annual average of 36 fatigued drivers were killed in weekday collisions as opposed to 16 who died in weekend collisions. A slightly higher percentage of drivers in weekday crashes (5.5%) were fatigued than those in weekend crashes (5.0%).

Figure 11: Average number and percent of fatally injured drivers who were fatigued in weekday and weekend collisions, Canada, 2009-2013



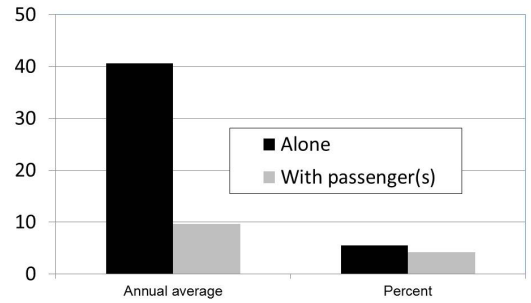
Seasonal variations in the total number of fatally injured fatigued drivers from 2009 to 2013 is shown in Figure 12. Collision dates have been categorized by seasons: winter (December-February), spring (March-May), summer (June-August), and fall (September-November). The season with the largest number of fatally injured fatigued drivers was summer (94), followed by fall (78), and spring (57). The season with the lowest number of these drivers was winter (31).

Figure 12: Number of fatally injured drivers who were fatigued by season of collision, Canada, 2009-2013



A comparison of the average number of fatally injured drivers who were alone versus fatally injured fatigued drivers who were accompanied by passengers is shown in Figure 13. On average, 41 fatigued drivers were alone in the vehicle compared to 10 who were accompanied by passengers. Among fatally injured drivers who were alone, 5.5% were fatigued as opposed to 4.2% of drivers who were accompanied by passengers.

Figure 13: Average number and percent of fatally injured drivers who were fatigued by number of occupants in vehicle, Canada, 2009-2013



Conclusions

The data from TIRF's National Fatality Database show a downward trend in the number of fatigue-related fatalities in Canada between 2000 and 2013. However, this downward trend has not been as pronounced as the corresponding trend for fatalities where fatigue was not a contributing factor during this same period. Fatally injured drivers who were fatigued accounted for the largest number of fatigue-related fatalities of the three types of victims.

Among fatally injured fatigued drivers, most were males. Within the various age groups, the most marked increase has been among drivers aged 65 and over. The most common type of vehicle driven by fatally injured fatigued drivers was the automobile. Of interest, the number of fatally injured commercial vehicle drivers who were fatigued was comparably low. Although they represent a smaller segment of vehicles on the road, these drivers generally travelled greater distances, and may be more prone to fatigue. In terms of substance use, the percentage of fatally injured fatigued drivers that tested positive for alcohol has decreased yet the percentage who tested positive for drugs has increased.

Lastly, fatigue-related fatal collisions occurred more frequently in the early morning and late afternoon. This is very consistent with the literature (Vanlaar et al. 2008) and speaks to the veracity of the fatality data. These crashes are slightly more likely to occur on weekdays than on weekends. Summer is the most common season for fatigue-related fatal collisions, perhaps due to greater distances being travelled as a result of optimum driving conditions. In addition, lone occupants of vehicles seem to be more likely to die in fatigue-related collisions than drivers who are accompanied by other occupants. This may be due to passengers keeping drivers engaged in conversation or vehicle occupants changing drivers during a trip.

There are 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 that they were tired, and the presence of alcohol or drugs in a fatally injured driver which may result in investigating officers indicating alcohol or drug use as a contributing factor in a collision report, but not fatigue. However, it has also been argued that 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, while the data show that there has been a decrease in fatigue-related fatalities since 2000, this decrease has been less pronounced in recent years. The data suggest that fatigue remains a concern today. Furthermore, the data also reveal that almost half of fatally injured drivers who were fatigued also tested positive for drugs. Further monitoring of this issue will be crucial in this regard.

References

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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 maintained with funding from Desjardins Insurance and the Public Health Agency of Canada (PHAC).

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