Drug Use Among Fatally Injured Drivers in Canada

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Abstract

Over the past several decades, information provided by coroners and medical examiners on the use of alcohol by drivers who die in motor vehicle crashes has been instrumental in monitoring the extent of the problem, evaluating the impact of programs and policies and generally furthering our understanding of the magnitude and characteristics of the alcohol-crash problem. In the same way, comparable information on the use of drugs by fatally injured drivers is critical in furthering our efforts to reduce the number of serious crashes in which psychoactive drugs are involved. The purpose of this study was to examine the results of toxicological tests performed on fatally injured drivers of motor vehicles in Canada to determine the extent and type of drug use as well as the characteristics of the people and the circumstances involved.

Data on alcohol and drug use from coroners’ and medical examiners’ files on drivers of motor vehicles who died in crashes from 2000 through 2010 in Canada. Psychoactive substances were grouped according to the system used by the Drug Evaluation and Classification program. Among drivers who died within six hours of the crash, 96% were tested for alcohol and 58.8% were tested for drugs. Of those tested, 33.7% were positive for a psychoactive drug; 38.5% were positive for alcohol. Overall, 56.7% of fatally injured drivers were positive for alcohol, drugs, or both. The most commonly detected substances were central nervous system depressants and cannabis. The present findings provide greater understanding of the involvement of drugs in serious crashes, revealing differences in the characteristics of drivers and crashes involving alcohol versus drugs that have implications for prevention and enforcement.

Background

In Canada, data from various sources have begun to shed light on the prevalence of driving after drug use. Self-report data from the Canadian Addiction Survey show that 4.8% of drivers in Canada admitted driving within two hours of using cannabis at least once in the past (Beirness & Davis 2007). In 2008, a roadside survey of alcohol and drug use among drivers in British Columbia found 10.4% of drivers tested positive for drugs; 8.1% were found to have been drinking (Beirness & Beasley 2010). In a study of drivers treated at a trauma centre in Toronto for injuries sustained in a serious crash found 41% tested positive for drugs and 35% were positive for alcohol (Stoduto et al. 1993). In a study of selected driver fatalities in British Columbia, Mercer and Jeffery (1995) reported that drugs were detected in about one-third of cases. Recent and more comprehensive data are required to better understand the magnitude and characteristics of drug-involved crashes.

Aims
The primary purpose of the present study was to examine data on the results of toxicological tests on bodily fluid samples collected by coroners/medical examiners from fatally injured drivers in Canada to provide an estimate of the prevalence of drug use by drivers killed in road crashes. A secondary purpose was to examine and compare the characteristics and crash circumstances of drug-positive drivers with those of drivers who tested positive for alcohol.

**Method**

For over three decades, data on alcohol use by persons who die in motor vehicle crashes in Canada have been collected from coroners/medical examiners' files and compiled in a national database (TIRF 2011). In 2000, the database was expanded to include the results of toxicological tests for drugs other than alcohol but these data are not included in the annual report of the national database.

The present study was restricted to fatally injured “drivers” – i.e., those persons deemed to be operating or in control of the vehicle – and who died and/or were tested for the presence of alcohol and/or drugs within 6 hours of the crash.

An initial review of the data suggested that drivers are sometimes tested for a wide variety of drugs, including many substances not known to have psychotropic properties and unlikely to cause driving impairment (e.g., acetaminophen, statins). Therefore, as an initial step, all substances listed in the database were recoded into categories corresponding to those used by the Drug Evaluation and Classification (DEC) program—Central Nervous System (CNS) depressants, inhalants, dissociative anaesthetics, cannabis, CNS stimulants, hallucinogens, and narcotic analgesics (IACP 1999).

Of the 20,485 drivers who died during the 11-year period from 2000 – 2010, 16,227 met these criteria for inclusion – 15,570 (96.0%) were tested for alcohol and 9,547 (58.8%) were tested for drugs. The 9,530 cases that were tested for both alcohol and drugs were divided into four groups according to drug and alcohol use: Alcohol and Drug Negative (n=339, 35.9%), Drugs only (n=188, 19.9%), Alcohol only (n=187, 19.8%), and Alcohol plus Drugs (n=188, 19.9%).

**Results**

Despite an increase in drug testing rates over the years, the percentage of drivers that test positive for drugs has remained relatively constant over the last nine years, ranging from 29.7% in 2000 to 36.7% in 2008. Similarly, the percent of drivers that tested positive for alcohol has shown no substantive or sustained change, ranging from 36.2% in 2002 to 41.1% in 2009. Central Nervous System (CNS) depressants and cannabis were the most frequently detected substances followed by CNS stimulants and narcotic analgesics. Hallucinogens, dissociative anesthetics and inhalants were rarely detected.

**Characteristics of the Drivers**

To examine the characteristics of drivers and crashes, the analysis focusses on fatally injured drivers in the Alcohol only and Drugs only groups – i.e., those that tested positive for only alcohol or only drugs.
Males account for 80% of the fatally injured drivers and compromise 87.6% of all alcohol-positive cases and 83% of all drug positive cases. Figure 1 displays the percentage of male and female drivers Alcohol only and Drugs only groups. (The Alcohol plus Drug group and the No Alcohol or Drug group are not shown.) Males are more likely (24.6%) than females (15.5%) to test positive for alcohol ($\chi^2 = 58.9$, df=1, $p < .0001$) yet there is no significant difference in the proportion of males (33.9%) and females (31.4%) that test positive for drugs ($\chi^2 = 0.36$, df=1, $p > .05$). Females were more likely to test positive for drugs than alcohol ($Z = 2.76$, $p < .01$) whereas males are more likely to test positive for alcohol than drugs ($Z= 5.91$, $p <.001$). The type of drug also varied by driver sex. Whereas females were most likely to test positive for depressants and opiates, males were most likely to test positive for cannabis and stimulants.

**Figure 1: Percentage of Male and Female Drivers Testing Positive for Alcohol and Drugs**

Figure 2 presents the percentage of Alcohol only and Drug only cases according to age group. (The Alcohol plus Drug group and the No Alcohol or Drug group are not shown.) The extent of alcohol and drug use varied considerably among age groups ($\chi=661$, df=18, $p<.001$). Alcohol was more prominent than drugs in many age groups, particularly those age 19 to 24 and 25 to 34. Of note, however, is that among drivers 18 years of age and under and those 55 years of age and over, drug use was more prevalent than alcohol.
**Figure 2: Drug and Alcohol Positive Driver Fatalities According to Age**

*Characteristics of the Crash*

Figure 3 shows the percentage of fatally injured drivers in the Alcohol only and Drug only groups according to the day of the crash. There were significant differences in the percentage of alcohol positive drivers according to day of the week on which the crash occurred ($\chi^2 = 403$, df = 18, $p < .001$). Alcohol was considerably more prevalent on weekends (Friday, Saturday, Sunday) than on weekdays. Drug use among fatally injured drivers was actually less common on weekends than weekdays. Although not shown in the figure, the Alcohol plus Drugs group showed a pattern similar to alcohol alone.
Figure 4 displays the percentage of driver fatalities that tested positive for alcohol or drugs according to the time of the crash. Once again, there were substantial differences in the pattern of alcohol- compared to drug-involved fatalities ($\chi^2=1892$, df=21, p<.001). Whereas alcohol-involved driver fatalities were most prominent during late night hours, drug-involved fatalities were most prevalent during daytime hours.

Discussion and Conclusions

The prevalence of drug use among fatally injured drivers is at a level comparable to that of alcohol. Central nervous system depressants and cannabis were the most frequently detected drug categories, followed by central nervous system stimulants and narcotic analgesics. These types of substances are known to have psychoactive properties that can impair the ability to operate a vehicle safely. But whereas research has established thresholds for alcohol above which it can be confidently presumed that the driver was impaired, the same cannot be said of most drugs. Hence, the mere presence of the substance does not necessarily mean the driver was impaired. Further research is required to help understand the relationship between drug dose and various types of behavioural and cognitive impairments relevant to driving.

Despite similar rates of drug and alcohol involvement among driver fatalities, the data indicate that the characteristics of drivers who test positive for drug use differ from drivers who test positive for alcohol use. Alcohol was more frequently involved in young among male driver fatalities whereas drug use was more frequently detected among female drivers. Males were also more likely than females to test positive for a combination of alcohol and drugs. The types of substances used by males and females also differed.

The temporal characteristics of alcohol- and drug-involved fatalities differed as well. Alcohol consumption tends to be a late-night weekend activity and the involvement of alcohol in driver fatalities reflects this phenomenon. Driver fatalities that were positive for drugs were more evenly distributed throughout all times of the day. Unlike alcohol, males and females were equally likely to test positive for psychoactive drugs.

In Canada, testing for alcohol among drivers who die in motor vehicle crashes has become commonplace, with 96% of fatally injured drivers who die within 6 hours of the crash having been tested for the presence and amount of alcohol. Over the past three decades these data have been an important surveillance tool, providing a valuable source of information on the magnitude of the alcohol-crash problem and have been instrumental in assessing changes in the problem over time. These data have also been utilized extensively in evaluating the impact of legislation and countermeasures in reducing the extent of the problem.

Since 2000, toxicological tests for drugs have been included in the national fatality database. The testing rate for drugs, however, lags considerably behind that for alcohol. Several jurisdictions have increased their rate of testing for drugs over the past few years, providing a better—but still incomplete—picture of drug use among fatally injured drivers. Many factors are at work in
determining which drivers get tested for drugs and which drugs are included in the testing protocol. Greater consistency in drug testing rates and drug testing procedures across jurisdictions would enhance the validity of the estimates of drug use derived from this database.

There remains a great deal to learn about driving after drug use. Although driving after drinking and driving after drug use appear to be related issues, the data suggest that they represent distinct social and behavioural phenomena. Drugs and driving is a more complex issue than drinking and driving and requires further research to understand the risks involved for different substances and different populations of drivers. Moreover, whereas the patterns of alcohol use and the resultant crashes are relatively predictable, the patterns of drug use and drug-involved crashes may vary by type of substance. This creates a very complex situation for prevention and enforcement. Hence, it cannot be assumed that the same techniques, policies, procedures and countermeasures that were developed and utilized effectively to combat drinking and driving can be readily adapted or transferred to deal with the drugs and driving issue. This highlights the need to develop unique prevention and enforcement strategies specific to the use of drugs by drivers.

References