



The Road Safety Monitor

Drugs and Driving ●



**TRAFFIC
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The Traffic Injury Research Foundation

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The Road Safety Monitor

Drugs and Driving

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Introduction —●

The Road Safety Monitor is a public opinion survey developed and managed by the Traffic Injury Research Foundation (TIRF) to take the pulse of the nation on key road safety issues. Conducted annually since 2001, the survey examines:

- ◆ what Canadians see as priority road safety issues and how concerned they are about them;
- ◆ their views about how to deal with these problems;
- ◆ what they know and don't know about safe driving practices; and
- ◆ how they behave on the highways.

The TIRF Road Safety Monitor includes a core set of questions that are asked each year to provide information on trends in attitudes, opinions and behaviours. This is supplemented by a set of questions that probe more deeply into special, topical, and emerging issues.

The fifth edition of the TIRF Road Safety Monitor contained 75 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 14 minutes to complete. It was administered by telephone to a random sample of Canadian drivers, by Opinion Search Inc. in September, 2005. A total of 1,218 drivers completed the interview. The data were weighted to ensure the results were representative of the national population. Based on a sample of this size, the results can be considered accurate within 2.8%, 19 times out of 20 (most conservative estimate).

Further details are provided in a previous report (Beirness et. al., 2005), which examined attitudes, perceptions, and practices related to drinking and driving. Other findings from the survey appear in a report on “Public Awareness and Concern About Road Safety” (Singhal et al. 2006). The present report focuses on drugs and driving.



Background —●

An extensive body of research has clearly established that alcohol use by drivers can severely increase the risk of collision (e.g., Mayhew et al. 1986). An equally impressive body of literature has tracked changes in the magnitude of the problem over the past two and a half decades and shown that the prevalence of alcohol use by drivers has declined, along with the prevalence of alcohol in serious collisions (Mayhew et al. 2005).

By contrast, much less is known about the contribution of drug-impaired driving to serious collisions or about the prevalence of drug use by drivers (see for example, TRB 2006). There most certainly is an extensive body of experimental literature documenting the extent of impairment produced by a wide variety of drugs (prescription medications, over-the-counter remedies, and illegal substances) on a number of tasks related to the safe operation of a motor vehicle (e.g., Kelly et al. 2004). However, relatively little reliable information is available on the frequency with which drivers use these drugs and, more importantly, the extent to which they are a causal factor in motor vehicle collisions (Mann et al. 2003; Shinar 2006; Stewart 2006).

There are many reasons for the disparity between the extent of knowledge about the role of alcohol in crashes and the role of drugs in crashes (see for example, Simpson 1985, 1986; Simpson and Vingilis 1991). Among them are: the difficulty in measuring drug use by drivers (alcohol can be easily detected and conveniently measured from breath samples but the detection and measurement of drugs requires sophisticated and expensive testing procedures using samples of blood); the vast number of drugs that have the potential to impair the ability to drive safely (each of which requires a specific test); poly-drug use and the frequent combination of drug use with alcohol use; and the difficulty of imputing causality using case-control comparisons that have proven valuable in the study of alcohol (see Simpson and Vingilis 1991).

These and other problems have led to difficulties in determining the magnitude and characteristics of the drug-driving problem. This was underscored by the findings at a recent symposium on Drugs and Traffic (TRB 2006). The summary comments by the symposium Chair capture the situation rather poignantly, “A large body of research now



exists that provides information about the performance effects of drugs, the risks posed by drugs in traffic...This research paints a complicated picture and many questions remain unanswered" (Stewart 2006, p. 2).

For example, some studies find that the crash risk for drivers who have been using cannabis is actually lower than for drivers who were drug-free; other studies have found an increased crash risk for cannabis users of 1.5 to 2.5 times that of sober drivers (see Beirness et al. 2006). Even some of the suggestive evidence that cannabis-positive drivers are more likely to be involved in, and responsible for, collisions than drug-free drivers (e.g., Blows et al. 2005; Ferguson and Horwood 2001) have been questioned on methodological grounds (e.g., Moskowitz 2006).

The evidence about the crash risk associated with benzodiazepines -- a group of central nervous system depressants frequently used to treat insomnia or anxiety -- is mixed as well (Beirness et al. 2006). The extent of risk varies with the type of benzodiazepine and the length of time the driver has been using it. Very few studies have examined the crash risk associated with stimulant drugs, including amphetamines and cocaine; those that have done so have reported only small increases in risk.

Despite this uncertainty in the scientific literature, it is clear from the popular press, awareness campaigns, and proposed legislative changes (e.g., providing police with the means to assess the presence of drugs in drivers through techniques such as Drug Recognition Experts) that there is rather widespread public and political concern about the issue of drugs and driving. Such concern appears to arise from two different sources of information. First, studies have repeatedly demonstrated that drugs are often found among fatally injured drivers. Such research has confirmed that although the total prevalence of drugs (licit and illicit) is less than the prevalence of alcohol, the use of drugs is by no means uncommon. For example, in a study in British Columbia (Jeffery et al. 1995) 48% of the cases tested positive for alcohol and 20% tested positive for some drug; in a more recent Quebec study (Dussault et al. 2002), 35% of the cases were positive for alcohol and 30% were positive for some drug.

Moreover, all the studies conducted in Canada over the past few decades have found that the most commonly detected illegal substance was cannabis -- 11% in the TIRF



studies in Ontario (Cimbura 1982, Cimbura et al. 1990); 13% in the B.C. study and 19.5% in the Quebec study, both of which were cited above. Drivers who were positive for cannabis were much more likely to be male and under the age of 25. Such findings are not unique to Canada (e.g., Drummer et al. 2004). However, one of the factors that confound the interpretation of the potential contributory role of cannabis in the fatal crashes is the co-occurrence of alcohol. For example, in the Ontario study, among those who were positive for cannabis, 84% were also positive for alcohol.

The second body of information that has contributed to the concern about drugs and driving comes from surveys, which have found relatively high rates of driving under the influence of some drugs, in particular cannabis, by some groups, such as young drivers (e.g., Adlalf et al. 2003a). Concern has been heightened by the common belief that young people are substituting marijuana use for alcohol because the former is difficult to detect. There is even recent evidence to support this conviction (e.g., Asbridge et al. 2005).

In summary, although the research community remains uncertain about the extent of crash risk posed by drugs, indirect evidence, such as the prevalence of use by drivers – both in the driving population at-risk and among those involved in serious collisions -- continues to provide a basis for concern. Accordingly, any new information on the subject is welcomed. In this context, the Road Safety Monitor contained a number of relevant questions that addressed issues related to:

- the level of public concern about drugs and driving;
- the extent to which Canadians drive after the use of drugs or medications; and
- the level of public support for various countermeasure options to deal with the problem of drug-impaired drivers.

Most of the questions in the Monitor related to the use of marijuana/hashish and this is the focus of the present report. This is not at all inappropriate given the evidence cited above that cannabis is the substance, other than alcohol, most frequently detected in collisions, and it is the drug that has received the greatest amount of public attention, particularly in light of changes to the Criminal code regarding simple possession and use.



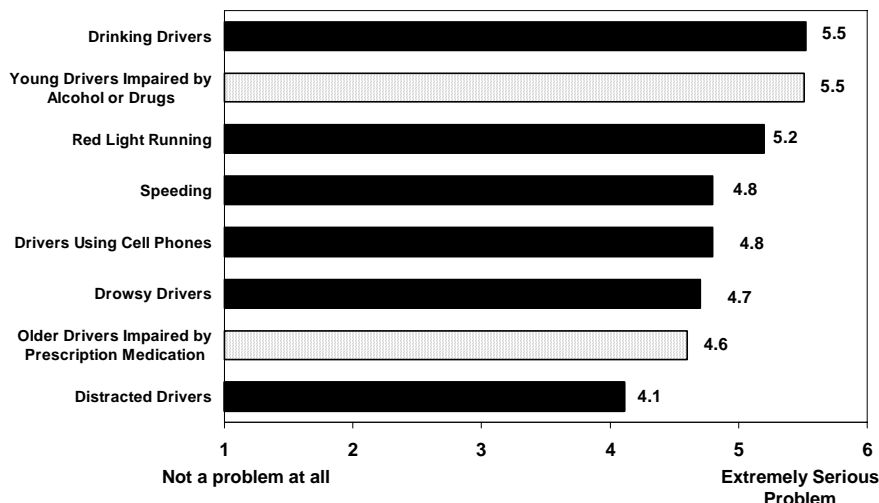
Results —●

ARE CANADIANS CONCERNED ABOUT THE PROBLEM OF DRUGS AND DRIVING?

The simple answer, based on responses to the questions contained in the Road Safety Monitor, is yes. The survey asked Canadian drivers to estimate the level of seriousness of a number of road safety issues, on a scale from 1 (not a problem at all) to 6 (extremely serious problem). Two of these items involved impairment by drugs: young drivers impaired by alcohol or drugs and, older drivers impaired by prescription medications.

As shown in Figure 1, the issue of young drivers impaired by alcohol or drugs was judged to be just as serious as the more general problem of drinking drivers – both received an average rating of 5.5. Because the item related to drugs specifies young drivers, it was of interest to determine if the perceived level of seriousness differed among drivers of various age groups. Using four age groupings, 16-24, 25-44, 45-64, and 65+, it was found that the average rating was not significantly different (ranging from 5.4 among 16-24 year olds to 5.6 among drivers over the age of 65). Smaller sub-groupings were also used and, again, there were no significant differences in the perceived level of seriousness.

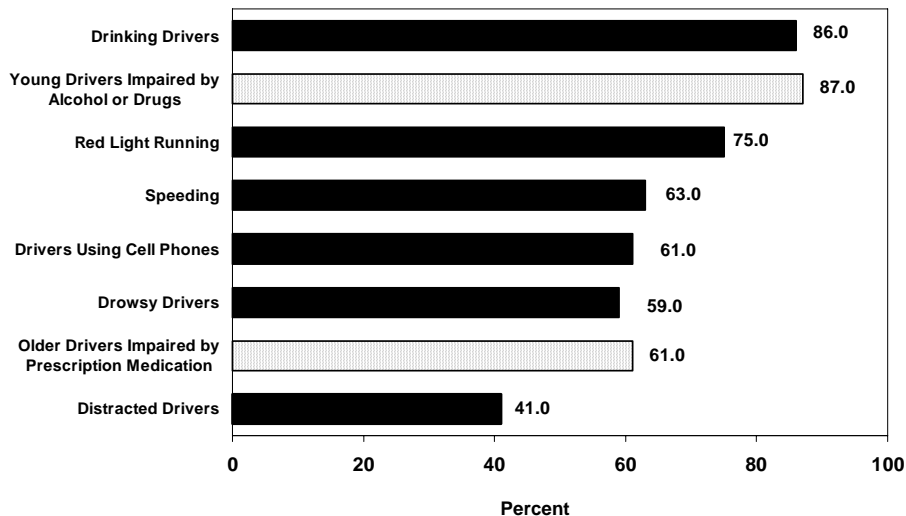
Figure 1: Perceived Seriousness of Road Safety Issues



The item concerning older drivers impaired by prescription medications was not perceived as serious as the issue of young drivers impaired by alcohol or drugs but still reflected considerable concern (average rating of 4.6 compared to 5.5, respectively). There were, however, significant differences in the perceived level of seriousness by age group in that younger drivers, age 16-24, were less concerned (4.3) about this issue than were older drivers (average rating for 25-44 and 45-64 was 4.7 and 4.5 for 65+).

The results were also examined in terms of the percent of respondents who rated the issues as something they were very concerned or extremely concerned about (ratings of 5 or 6). The results are shown in Figure 2.

Figure 2: Percent Perceiving Issue as Serious or Extremely Serious



As can be seen, 87% of Canadians view the problem of young drivers impaired by alcohol or drugs as a very serious or extremely serious problem. As well, 61% consider the issue of older drivers impaired by prescription medication to be a very serious or extremely serious problem.

It was also of interest to examine whether there was a relationship between personal drug use and perceptions about the seriousness of the problem. An item in the survey asked respondents if they had used marijuana or hashish during the past 12 months. Those who admitted to use were compared to those who did not in terms of their perceptions about the seriousness of the eight problems shown in Figures 1 and 2. Only

7% (n=89) of those surveyed indicated they had used marijuana or hashish in the past 12 months. Perhaps not surprisingly, this group's perception of the seriousness of the problem of young drivers impaired by alcohol or drugs was significantly less ($p<.05$) than that of non-users (5.2, compared to 5.5, respectively).

DRIVING AFTER DRUG USE

Prevalence

Respondents who indicated they had used marijuana or hashish during the past 12 months were also asked whether during the past year they had ever driven within two hours of using it – 2.4% of the drivers in the survey indicated they had done so. When applied to the entire population of licensed drivers, this suggests that an estimated *half-million (520,000) Canadians admit to driving after using marijuana/hashish at least once in the past 12 months*. In these terms, the behaviour is far less uncommon.

At the same time, it is worth mentioning that the estimated number of Canadians who admit to driving after using marijuana/hashish is far less than the number who report driving while impaired by alcohol – an estimated 1.5 million Canadian drivers said they had driven at some time during the past year when they thought they were over the legal limit (Beirness et al. 2005).

Trends

The question regarding the use of marijuana/hashish and driving was the same as the one asked in previous editions of the Road Safety Monitor (Beirness et al. 2003; 2004), so the results can be compared. In the 2002 survey (Beirness et al 2003), a very small percent of respondents (1.5%) reported that they had, at some time during the past year, driven within two hours of using marijuana. This figure increased to 2.1% in the 2004 survey and 2.4% in the current survey. Although the numbers are small, the change from 2002 to 2005 represents a statistically significant increase. It is noteworthy that these estimates of the prevalence of driving after using marijuana use are similar in magnitude and trend to those from surveys conducted in Ontario (Adlaf et al. 2003b),



which reported that 1.9% of drivers admitted to driving after marijuana use in 1996/97 and 2.9% did so in 2002, and appear to be related to an overall rise in the use of the drug.

Marijuana and alcohol use

There is a substantial body of evidence that shows a high correlation between alcohol use and marijuana/hashish use (e.g., Christophersen 2006). Indeed, in studies that have examined alcohol and drugs among drivers involved in serious crashes, it is not uncommon to find $\frac{3}{4}$ of those who are positive for cannabis are also positive for alcohol.

Consistent with these data, the current survey found that many (69%) of those who reported driving after using marijuana/hashish also reported driving within two hours of drinking. This has important safety implications because it has been established that the combined use of marijuana and alcohol increases the risk of collision (Stewart 2006) – some have suggested that the two substances impair different sets of skills and capacities, so the combined effects are additive; some have suggested they might even be multiplicative.

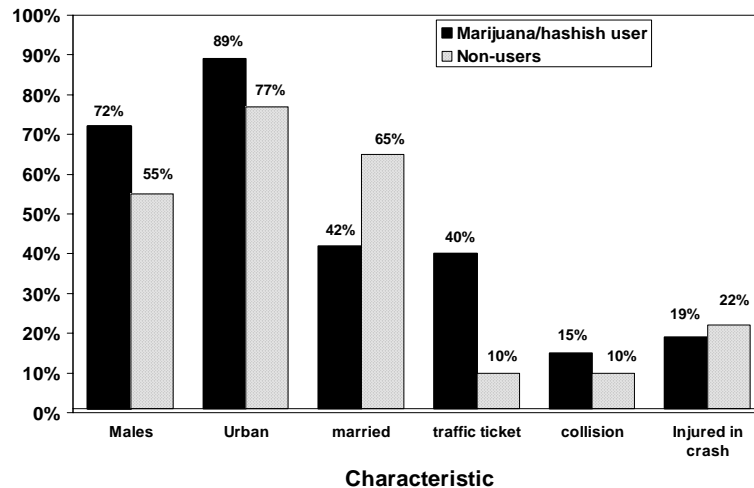
CHARACTERISTICS OF MARIJUANA/HASHISH USERS

The characteristics of respondents who admitted to using marijuana or hashish in the past 12 months were compared to those who reported that they did not use these substances. There were a number of differences. The group of marijuana/hashish users was significantly younger than the rest of the drivers in the survey who did not use these drugs – e.g., 60% of the users were under the age of 35, compared to 30% of the non-users. At the other end of the age spectrum, only 4% of the users were over the age of 55, compared to 30% of the non-users. Other findings from the comparison of the two groups are summarized in Figure 3.

As can be seen, those who reported using marijuana/hashish were more likely to be male, (72% versus 55% among non-users), live in an urban setting (89% vs. 77%), and less likely to be married (42% vs. 65%).



Figure 3: Characteristics of Marijuana/hashish users



Perhaps of greater interest, those who reported using marijuana/hashish were more likely than non-users to have received a traffic ticket in the past 12 months (40% vs. 10%) and more likely to have been involved in a traffic collision (15% vs. 10%). The difference in the proportions who reported being injured in a collision (19% vs. 22%) was not statistically significant. Collectively, these findings suggest either that the use of the drug increases risk taking, or that users are, in general, more likely to be risk takers. This is explored more fully in the next section.

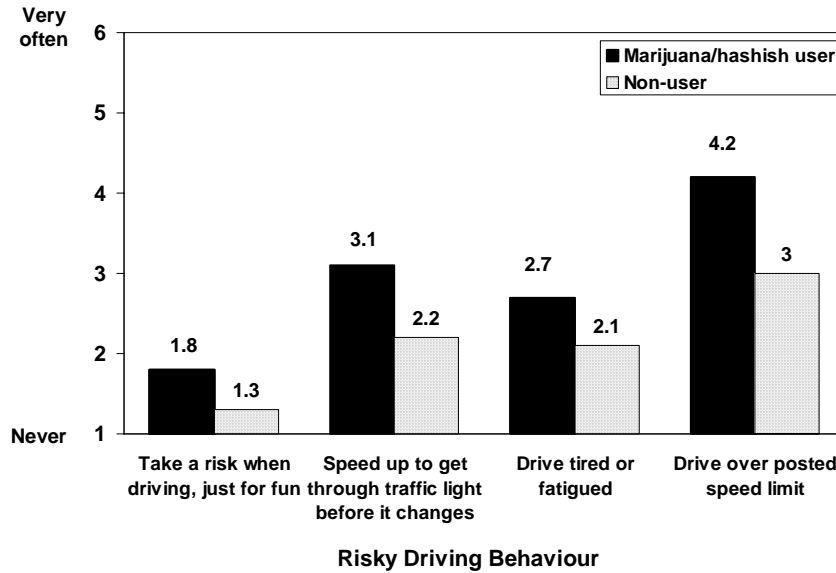
Risky behaviours

There is a considerable body of evidence showing that a pattern of lifestyle characterised by such things as health compromising activities (e.g., smoking, unprotected sex) and negative attitudes toward health and safety are related to a wide range of risky behaviours, including driving (e.g., Jessor et al. 1991; Mayhew et al. 2006).

In the current survey, respondents were asked to indicate how often they engage in a variety of risky driving behaviours -- on a scale ranging from 1 (never) to 6 (very often). Respondents who admitted to using marijuana or hashish in the past 12 months were compared to those who did not in terms of the frequency with which they engaged in risky driving practices. The results are displayed in Figures 4 and 5 – Figure 4 shows the mean frequency separately for marijuana/hashish users and non-users (range = 1-6); Figure 5 shows the percent of each group who reported engaging in each of the behaviours often or very often (ratings of 5 or 6).



Figure 4: Frequency of Risky Driving Behaviours



As can be seen in Figure 4, although the admitted frequency of engaging in these risky driving practices was low in most cases, in all instances marijuana/hashish users were found to take risks more often than those who did not use marijuana/hashish (all differences significant, $p < .05$). This is especially noticeable for speeding (4.2 for users compared to 3.0 for non-users).

Figure 5: Percent Who Engage Often or Very Often in Risky Driving Behaviours

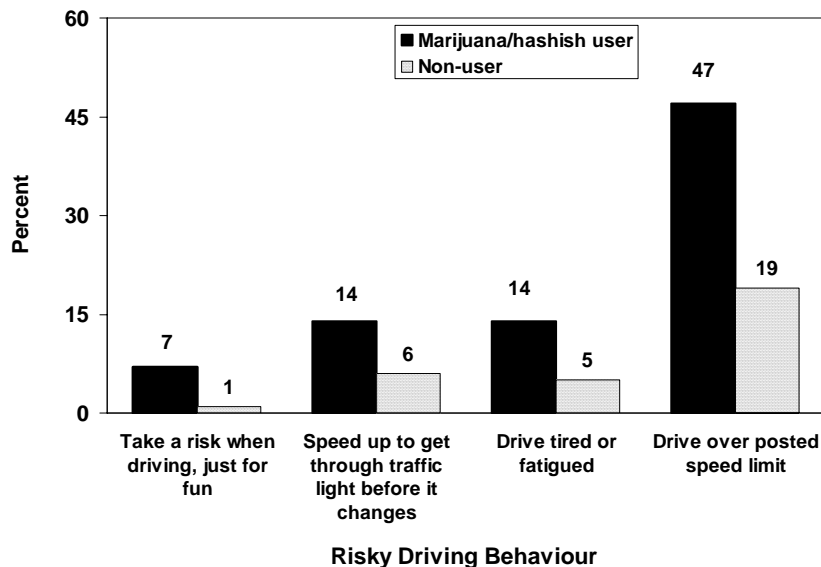


Figure 5 shows the percent of drivers who admitted to engaging in the risky driving practices often or very often. Again, although the percent who admit to engaging in these behaviours often or very often is small, in most cases marijuana/hashish users are

significantly more likely to engage in them than non-users. Indeed, nearly half of the marijuana/hashish users admit that they often or very often drive over the posted speed limit, compared to 19% of non-users.

It is possible, however, that the relationships described above are an artifact of the demographics of the groups being compared – for example, as described previously, the sample of marijuana/hashish users was significantly younger than the non-users and more likely to be male. To test the possibility that the differences observed in Figures 4 and 5 were an artifact of age or gender, logistic regression analyses were conducted on the differences between users and non-users (in the likelihood of engaging in each of the risky behaviours), controlling for age and gender.

Results still showed that users were significantly more likely than non-users to “take a risk when driving just for fun” and “to drive over the posted speed limit” (odds ratios of 0.2 and 0.4; $p=.003$ and $p=.001$ respectively). In other words, these differences could not be explained by age or gender differences between the users and non-users. However, the differences between users and non-users in terms of the other two risky driving practices (“speeding up to get through a traffic light before it changes” and “driving while fatigued or tired”) could be explained by the differences in age between the groups.

It should be noted that these findings and similar ones referenced above, illustrate another reason it has been so difficult to establish a causal link between the impairing effects of cannabis and crash risk. It is possible that it is not the effects of cannabis but rather of lifestyle factors, including such things as a willingness to take risks, that produce an elevated likelihood of crash involvement.

The survey also provided a means for probing the perceptions of respondents in terms of how likely it is they would require medical attention in the next 12 months as a result of a road crash, cancer, heart attack, diabetes, sports/recreational injury or workplace injury. In particular, it was of interest to examine whether marijuana/hashish users viewed themselves as more/less likely to require medical attention than non-users. Figures 6 and 7 present the relevant data.

Figure 6: Perceived Chances of Requiring Medical Attention in the Next 12 Months

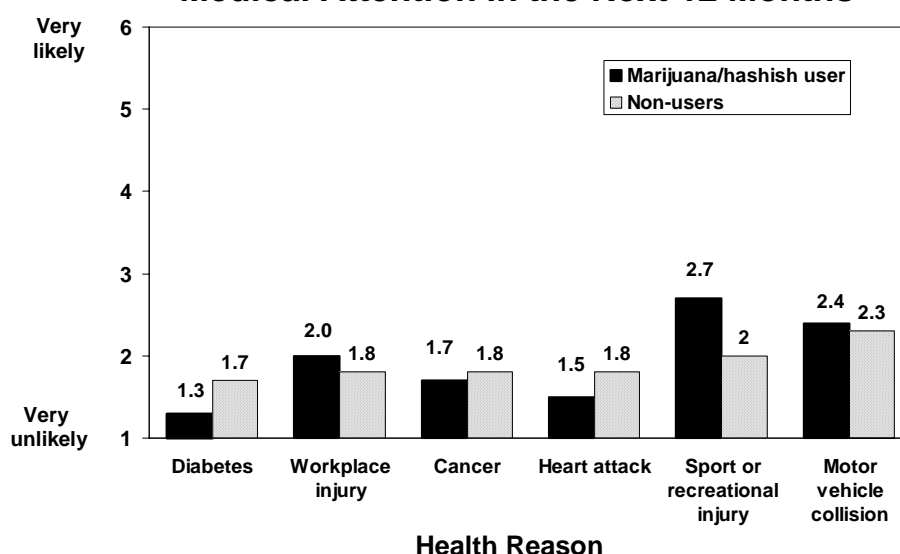


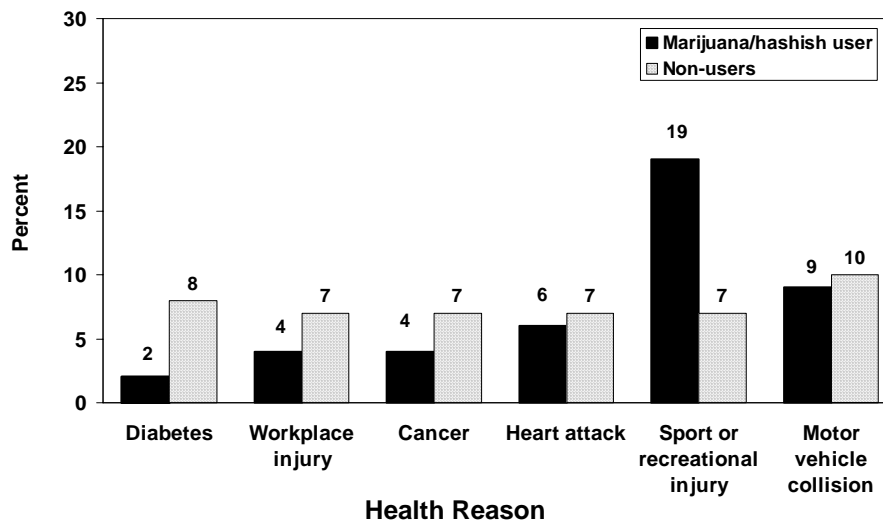
Figure 6 shows the average rating, from 1 (very unlikely) to 6 (very likely), for requiring medical attention as a result of a variety of health reasons, separately for marijuana/hashish users and non-users. Users viewed themselves as more likely to require medical attention for injuries arising from sport or recreation, workplace, or a motor vehicle collision. The difference between users and non-users was significant for sport or recreational injury ($p < .05$). On the other hand, users viewed themselves as less likely to require medical attention for diseases such as diabetes, cancer, or heart attack. The difference between users and non-users was significant for heart attack ($p < .05$).

Figure 7 shows the percent of respondents who estimated their chances of requiring medical attention for the various health/safety reasons as likely or very likely. The pattern of findings is similar to what is shown in Figure 6. However, some of the differences are more evident. In particular, with the exception of sports/recreational injury, far fewer marijuana/hashish users believe they are likely to require medical treatment in the next year than non-users. For example, the proportion of non-users who think they will require medical attention for diabetes, cancer or workplace injury is some 2 to 4 times more than those who use marijuana/hashish -- users appear to view themselves as less vulnerable. The very obvious exception is sport or recreational injury, where nearly 1/5 of the marijuana/hashish users believe it is likely or very likely



they will need medical attention during the next year – this is 2 ½ times greater than the proportion of non-users. The extent to which this difference is a function of exposure to sports/recreation is not known but is noteworthy.

Figure 7: Percent Perceiving Chances of Requiring Medical Attention in the Next 12 Months as Likely or Very likely



However, the differences shown in Figures 7 suggest an age effect. For example, older respondents are more likely to be concerned about a heart attack, cancer or diabetes than younger respondents; in turn, younger respondents are likely to be more concerned about a sport or recreational injury. And, given that the marijuana/hashish users are younger than the non-users, the findings could be an artifact of age. To test this possibility, logistic regression analyses were performed on the comparisons shown in Figure 7, controlling for age and gender. Most of these differences can be accounted for by differences in the ages of the groups of users and non-users.

ENFORCEMENT ACTIONS

Respondents were asked to rate, from 1 (strongly disagree) to 6 (strongly agree), a variety of statements associated with various enforcement scenarios. Three of these items involved views on drug testing; 1) all drivers involved in crashes causing injury should be tested for drugs, 2) police should be able to demand a blood, urine, or saliva test of drivers if suspected of being under the influence of drugs, and 3) drivers should be required to submit to tests of physical coordination if suspected of being under the



influence of alcohol or drugs. The other items included one on “more spot checks for drinking drivers” and two on speeding (photo radar, and greater enforcement of speed limits).

The findings are shown in Figures 8 and 9. Figure 8 provides the average ratings on the 6-point scale of agreement, separately for marijuana/hashish users and non-users; Figure 9 provides the percent of each group that agreed or strongly agreed with the actions.

Figure 8: Agreement With Various Enforcement Actions

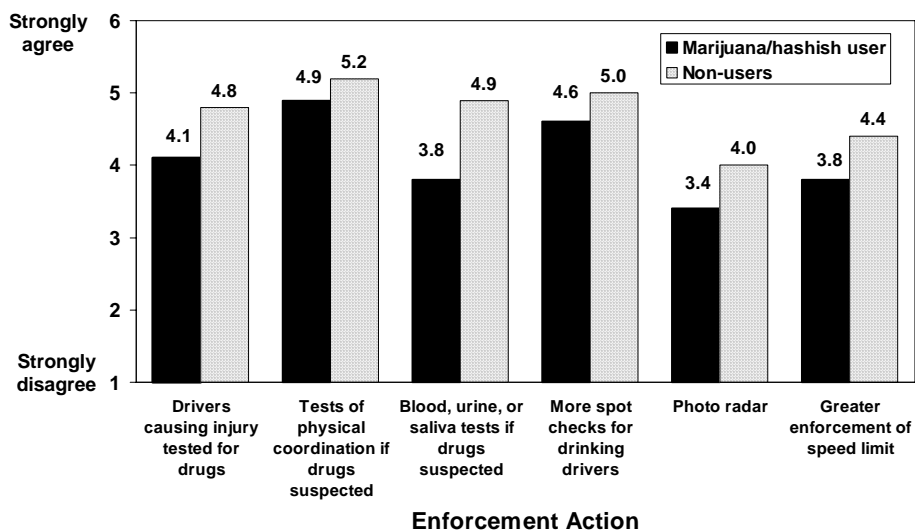
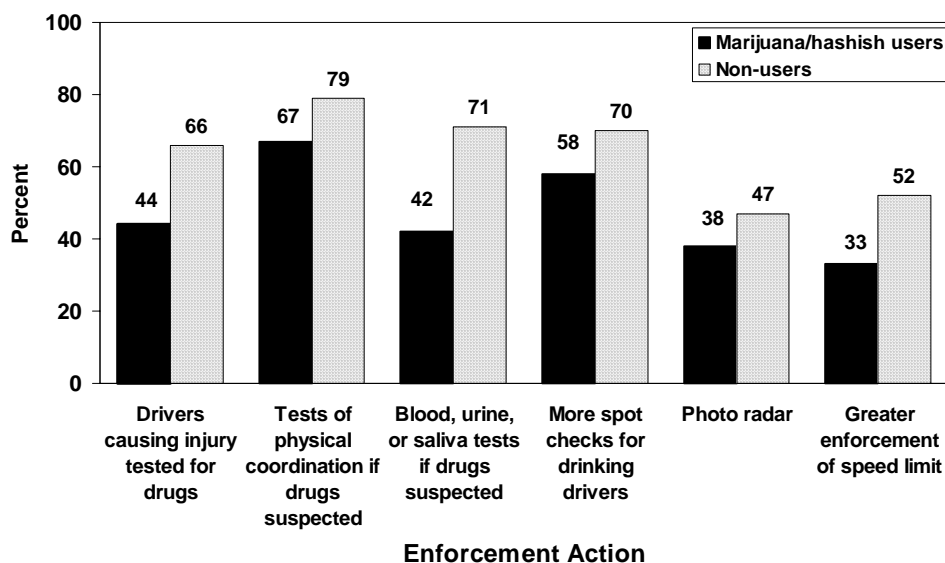


Figure 9: Percent Agreeing or Strongly Agreeing With Various Enforcement Actions



For all three items related to testing for drug use, those who admitted to using marijuana/hashish within the past 12 months were significantly less supportive of these actions than non-users ($p < .05$). This is particularly evident for the item involving the mandatory testing for drugs of drivers involved in an injury collision, and the one suggesting that tests should be performed if the driver is suspected of using drugs. In these cases, only about 42% of the marijuana/hashish users agreed or strongly agreed with these actions, compared to nearly 71% of non-users.

Moreover, marijuana/hashish users were significantly less approving than non-users of other enforcement actions (those related to drinking drivers and speeding), suggesting a less supportive attitude toward enforcement in general.

On the other hand, marijuana/hashish users did not differ from non-users in their support for the banning of cell phone use while driving (4.2 compared to 4.4 non-users), the immediate impounding of vehicles of drivers who fail the breath test for alcohol (5.3 compared to 5.1 for non-users), or the mandatory use of ignition interlocks for all convicted impaired drivers (5.3 for both drug users and non-users).



Summary and Conclusions —●

The data on drugs and driving obtained from the Road Safety Monitor are limited but informative. There is evidence from the survey that the public is concerned about the issue of drugs and driving. As noted in the introduction, such concern is reasonably widespread and, in part, likely fuelled by the ambiguity and often contradictory scientific evidence – for example, some research concludes that driving after marijuana use increases the risk of collision; other studies show this is not the case.

The survey found, consistent with other studies, that the prevalence of driving after marijuana/hashish use is rather limited. Some 2.4% of survey respondents admitted to driving after using marijuana/hashish in the past year. Although this represents a very small proportion of drivers, when applied to the entire population of licensed drivers, this suggests that an estimated half-million Canadians admit to driving after using marijuana/hashish at least once in the past 12 months. In these terms, the behaviour is far less uncommon.

Moreover, this represents a significant increase in the frequency of marijuana/hashish use and driving over the past three years.

Also consistent with previous research, the survey found a high correlation between alcohol use and marijuana/hashish use. Sixty nine percent of those who reported driving after using marijuana/hashish also reported driving within two hours of drinking. The co-occurrence of these two substances increases the risk of collision and is a concern for traffic safety.

Drivers who admitted to using marijuana/hashish were found to differ from non-users in several ways. Users were decidedly younger, more likely to be male, unmarried and live in urban areas. They were also more likely than non-users to take risks when driving just for fun, and more likely to speed; they were more likely to have received a traffic ticket, and more likely to have been involved in a collision. Finally, and not surprisingly, they were far less supportive of enforcement initiatives that would help police detect drivers who have been using drugs.



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