Drugs and Driving FAQs

CCSA - CCLAT

www.ccsa.ca

This Drugs and Driving FAQ was prepared by Dr. John Weekes, Senior Research Analyst, Canadian Centre on Substance Abuse (CCSA). It is intended to provide current, objective and empirically-based information to guide discussions on the effectiveness of measures to detect and reduce the incidence of drug-impaired driving, as well as to treat those with a substance use problem who drive while their ability is impaired by drugs.

What is "drugged driving"?

- Typically, the terms "drugged driving" and "drug-impaired driving" refer to driving a motor vehicle while impaired by any type of drug or medication or combination of drugs, medication and alcohol. These include illicit substances, mind-altering prescription medications, and over-the-counter remedies and medications that affect an individual's ability to drive safely.

What does Canadian legislation say about driving under the influence of drugs?

- According to the Criminal Code of Canada (S. 253),

  "Every one commits an offence who operates a motor vehicle or vessel or operates or assists in the operation of an aircraft or of railway equipment or has the care or control of a motor vehicle, vessel, aircraft or railway equipment, whether it is in motion or not,

  (a) while the person's ability to operate the vehicle, vessel, aircraft or railway equipment is impaired by alcohol or a drug."[1]

- S. 253 indicates that, in principle, a driver can be charged, prosecuted and convicted for operating a vehicle while impaired by the effects of a drug.
- Existing federal legislation only permits peace officers to issue a warrant to obtain a blood sample in drug impairment cases where the person was involved in an accident involving injury or death (S. 256).
- Accordingly, a peace officer must rely on an assessment of signs and symptoms of impairment, driving behaviour, and witness testimony.
- However, in many provinces, a driver is under no obligation to participate in a roadside assessment of potential impairment (e.g., Standardized Field Sobriety Test) if requested by a peace officer.
- Whereas there is a legal limit for the amount of alcohol in a driver's blood (e.g., 80mg in 100 ml of blood); there are no comparable limits for any drug.
- Taken together, current legislation makes it difficult for law enforcement personnel to obtain the necessary evidence for a conviction.

What changes to the Criminal Code are proposed regarding driving under the influence of drugs?

- Bill C-16, an Act to Amend the Criminal Code (Impaired Driving) is currently being considered by the House of Commons Standing Committee on Justice, Human Rights, and Public Safety and Emergency Preparedness.
- If passed into law in its current form, the Act will authorize trained police officers to require drivers to undergo the Standardized Field Sobriety Test (SFST) and the Drug Recognition Expert (DRE) assessment process if the officer believes that the person is driving under the influence of a drug.
- If a driver fails the SFST, the officer would have reasonable grounds to believe that a drug-impaired offence has occurred (S. 253[a]) and can require the driver to submit to a DRE evaluation at the police station.
- The results of the SFST and DRE procedures would provide police with reasonable grounds to demand a sample of bodily fluids (oral fluid, urine or blood). Charges can only be laid after the presence of drugs in bodily fluids is confirmed by laboratory analysis.
- Drivers who refuse to comply with an officer's request for physical sobriety tests and bodily fluid samples would be charged with a criminal offence (similar to provisions currently in place for those who refuse to provide a breath or blood sample for alcohol).

Do the proposed legislative changes in Bill C-17 affect the issue of drug-impaired driving?

- Bill C-17, an Act to Amend the Contraventions Act and Controlled Drugs and Substances Act, is currently before the House of Commons Standing Committee on Justice, Human Rights, and Public Safety and Emergency Preparedness.
- Under the legislative changes proposed in Bill C-17, possession and use of cannabis will remain illegal, but the criminal court processes and criminal penalties will be replaced with fines for possession of small amounts of cannabis for personal use.
    - Possession of 15 grams or less of cannabis will be punishable by a fine of $150 for an adult and $100 for a person under the age of 18.
    - Possession of one gram or less of cannabis resin (hashish) will be subject to a fine of $300 for an adult and $200 for a person under the age of 18.
    - In cases of possession of 15 grams or less of cannabis or one gram or less of hashish where aggravating factors exist such as driving a car, the fines are $400 for an adult and $250 for a person under the age of 18. Of course, the individual may also be charged with drugged driving if it is determined that they have consumed cannabis and it has impaired their ability to drive.

- S. 253(a) of the Canadian Criminal Code will continue to be in effect and driving while impaired by a legal or illegal drug (including alcohol) will remain a criminal offence.
- The criminal penalties for impaired driving include:
    - A fine of not less than $600 and a minimum one-year driving prohibition for a first offence of driving while impaired.
    - A minimum 14 days in jail for a second offence.
    - Imprisonment not exceeding 10 years for impaired driving causing bodily harm.
    - The possibility of life imprisonment for impaired driving causing death.

How prevalent is the problem of drugged driving?

- Much additional research is needed to shed light on the extent and nature of drug-impaired driving in Canada. However, based on available evidence, it appears that driving after consuming various types of illegal and mind-altering legal drugs is a serious problem in Canada (as it is elsewhere in the world).
- The Road Safety Monitor 2002 study published by the Traffic Injury Research Foundation of Canada (TIRF) indicated that 18% of drivers reported taking illegal drugs, certain prescription drugs, or over-the-counter medicines within two hours of driving during the previous 12 months.[2]
- The same study revealed that almost four million Canadians admitted to driving after taking a drug that could impair their ability to drive safely.[3]

- According to TIRF's Road Safety Monitor, Canadians ranked drugs and driving a close second behind drinking and driving as the most serious road safety problem.[4]
- Results from the Cannabis Use and Driving Among Ontario Adults study (2003) showed that about 3% of drivers in Ontario drove within an hour of consuming cannabis on at least one occasion in the past year.[5]
- Data from the 2005 Canadian Addiction Survey (CAS) showed that about 1% of Canadians aged 15 or older drove within two hours of using cannabis, marijuana, or hashish at least once within the previous 12 months.[6]
- According to the Ontario Student Drug Use Survey (2003), almost 20% of high school drivers acknowledged driving within one hour of using cannabis products at least once in the preceding year.[7]
- A Quebec roadside study using urine samples from drivers who agreed to participate found that about 12% tested positive for drugs.[8]

To what extent are drugs actually involved in road collisions?

- Although studies are limited in this area, available research conducted in Canada and elsewhere confirms that a variety of drugs (alone and in combination with alcohol) are implicated in a significant number of crashes involving both fatally and seriously injured drivers, passengers, drivers and passengers in other vehicles, and pedestrians.
- An Ontario study of fatally injured drivers conducted in the early 1980s showed that drugs were found in 26% of cases and combinations of drugs and alcohol were found in 54% of cases (alcohol alone was found in 57%).[9]
- A study of fatally injured drivers in British Columbia found that 9% of crashes involved drugs, and 11% involved alcohol and drugs.[10]
- A study conducted in Quebec found that drug metabolites were found in the urine of 32% of fatally injured drivers. Cannabis (20%) and benzodiazepines (10%) were found most frequently.[11]
- Similarly, body fluid analysis of seriously injured drivers admitted to the Regional Trauma Unit at Sunnybrook Health Sciences Centre in Toronto found that cannabinoids were detected most often (13.9%), followed by benzodiazepines (12.4%), and cocaine (5.3%).[12]

What kinds of drugs are typically associated with drugged driving?

- While many people may think of illegal drugs (heroin, cocaine, cannabis, etc.) when they hear the term "drugs and driving," a wide range of prescription drugs (benzodiazepines, codeine, amphetamines, etc.), and numerous over-the-counter medications can influence the ability to drive safely and are implicated with drugged driving. For example, some antihistamines cause drowsiness and can affect concentration and reaction time, while tranquillizers, cold remedies (e.g., cold tablets), cough syrup, anti-nausea medication, non-prescription sleep medication, and other over-the-counter pain medications have the potential to affect a person's ability to safely control a vehicle. Of concern are drugs that affect key aspects of driver performance such as awareness, attention, concentration, reaction time, and motor coordination.
- The 2002 Road Safety Monitor revealed that over-the-counter medications are the drugs most frequently associated with driving (15.9%); all other types of drugs were reported much less frequently (e.g., prescription medications [2.3%], cannabis [1.5%], and other illegal drugs [0.9%]).[13]
- Of additional concern is the serious impact of the interaction of alcohol with these various drugs. Canadian and international studies examining both fatally and seriously injured drivers revealed that cannabis or combinations of cannabis and alcohol are associated with crashes.[14,15,16]
- Research suggests that cannabis is the illegal drug most frequently implicated with drugged driving. This pattern is found both in Canada and in other parts of the world.[17,18,19]
- After cannabis, benzodiazepines, cocaine and opiates are the drugs most frequently detected in fatally or seriously injured drivers.[20,21]
- It is noteworthy that after cannabis, benzodiazepine (prescribed for anxiety and sleep disturbances) is the class of drug most frequently associated with drug-impaired driving. Frequently, patients drive after consuming these medications without realizing the potential risk they pose to pedestrians, other drivers and themselves.

What are the characteristics of those who use drugs and drive?

- Again, systematic research in this area of investigation is limited.
- Research at the Centre for Addiction and Mental Health (CAMH) revealed that young males are most likely to drive after using cannabis.[22]
- The 2002 Road Safety Monitor confirmed that young males in Canada are the most likely to drive after using marijuana and other illegal drugs (and to engage in other high-risk activities).[23]
- The 2001 Ontario Student Drug Use Survey found that almost 20% of students in Grades 10-13 with a driver's licence reported driving within an hour of using cannabis.[24]
- Similarly, the 2002 Nova Scotia Student Drug Use Survey reported that just over 30% of Grade 12 students with a driver's licence reported driving within one hour of cannabis use.[25]
- In the U.S., data from the 2002 and 2003 National Surveys on Drug Use and Health found that 14% of youth aged 16 to 20 drove under the influence of illicit drugs within the past year and 8% drove under the influence of both alcohol and an illicit drug.[26]
- Cannabis users with a university degree are less likely to drive under the influence of cannabis, whereas those who did not complete high school are more likely to drive after using cannabis.[27]

What are some of the challenges associated with drugged driving?

- The similarity between drug-impaired and alcohol-impaired driving is superficial at best. Research shows that the situation, context and circumstances around drug-impaired driving are both quantitatively and qualitatively different from alcohol-impaired driving, and few direct comparisons can be made.
- The presence of drugs in the body cannot be identified and assessed in the same way as alcohol. Whereas alcohol can be detected and measured easily and reliably from breath samples, detection of drugs requires laboratory analysis of samples of blood, urine, or oral fluid.
- Moreover, unlike alcohol, where there is agreement on levels of blood alcohol content or cut-offs (e.g., BAC 0.08/0.05) that are consistent with impairment, simply identifying the presence of a drug in a body fluid sample (blood, urine, saliva) does not necessarily mean that consumption occurred recently, or that the person's ability to drive was impaired at the time the sample was taken.
- Different drugs affect the body in dramatically different ways.
- Moreover, while substantial research links alcohol concentration levels to impairment, there is much less research linking drug concentration levels with specific impairment levels. This problem is compounded by the large number of drugs (illegal, prescription and over-the-counter) with the potential to adversely affect driver performance.

What methods or technologies are used for detecting drugged driving?

- When a police officer suspects that a driver is impaired, but a breath analysis yields a low or negative result, two methods are used in Canada and other countries to detect alcohol and drug impairment, both requiring specialized training:
    - Standardized Field Sobriety Test (SFST)
    - Drug Recognition Expert (DRE) assessment process.
- As mentioned above, under current Canadian legislation, drivers have the right to refuse either the SFST or the DRE. However, it is a criminal offence in Canada to refuse a breath analysis test or a request to provide a specimen sample of body fluids for alcohol.

What is the Standardized Field Sobriety Test?

- The Standardized Field Sobriety Test (or Tests) was specifically designed as a quick roadside assessment process to assist police officers in making an initial determination of impairment by alcohol or other drugs.
- Although a variety of roadside tests can be administered, the SFST consists of three tests:
    1. "Walk and Turn"
    2. "One Leg Stand"
    3. "Horizontal Gaze Nystagmus" (to assess the extent of jerky eye movements).

- In the U.S., all three of these tests have been evaluated by the National Highway Traffic and Safety Administration (NHTSA) and are considered reliable measures to help police officers make an initial determination of likely impairment due to alcohol or other drugs.
- Currently in Canada, there are more than 2,000 officers in all provinces and territories trained to administer the SFST[28]

What is the Drug Recognition Expert (DRE) Program?

- The DRE program was developed in California by the Los Angeles Police Department in the 1970s to provide a systematic protocol to identify individuals whose ability to drive has been impaired by one or more drug and to classify the type of drug the individual has consumed. It was determined that a standardized and valid procedure was needed in order to obtain a conviction.
- The DRE is an elaborate, multi-faceted assessment procedure that consists of the following 12 steps[29]:

    1. Breath or blood alcohol concentration
    2. Arresting officer's interview
    3. Preliminary examination
    4. Eye examinations
    5. Divided attention tests
    6. Vital signs examination
    7. Darkroom examination of pupil size (including examination of nasal and oral cavities)
    8. Muscle tone
    9. Examination for injection sites
    10. Statements, interrogation
    11. Opinion
    12. Toxicology (specimen collection and analysis).

- Currently 43 U.S. states, the District of Columbia, and Canada use the DRE program.
- In addition, DREs are trained in Australia, England, Norway, Sweden and Germany.
- The program was initiated in Canada in British Columbia in 1995.
- The Canadian Association of Chiefs of Police, in partnership with the former Solicitor General of Canada (now Public Safety and Emergency Preparedness Canada), initiated the first national DRE training course in 2003. All 10 provinces have DRE-trained officers.[30]
- Canada's renewed Drug Strategy, announced in May, 2003, included funding to expand DRE training for Canadian police officers.
- In 2004, the Government of Canada announced $6.9 million in funding for Canadian police officers to be trained to use the SFST and the DRE. This funding is in addition to an initial injection of $910,000 provided by Canada's Drug Strategy and $4.1 million in funding re-allocated by the Royal Canadian Mounted Police (RCMP).[31]
- In 2002, a Senate Special Committee on Illegal Drugs recommended that the Criminal Code of Canada be amended to admit evidence from expert police officers trained to detect persons driving under the influence of drugs.
- There is a sizable cost associated with the basic training of police officers to become drug recognition experts. Additional costs include ongoing professional development and quality control to ensure that officers maintain (or enhance) the accuracy of their assessments and do not depart from the standardized approach.

How accurate is the DRE approach?*

- Early studies, often cited as evidence of the validity of the DRE procedure, demonstrated that trained evaluators (including two DRE instructors) correctly identified drug classes only 49% of the time.[32]
- Overall, studies indicate that when conducted consistently, according to the standardized approach, and by trained officers, the DRE approach appears to be relatively accurate in helping police officers to reach a basic determination as to whether a driver is impaired by a drug or drugs. Indeed, these studies suggest that the

* It should be pointed out that differences in rates of accurate detection may be partly attributable to different cut-off levels used by laboratories in various jurisdictions.

approach can contribute meaningfully to a police officer's decision about whether an individual's ability to drive is impaired by drugs other than alcohol.[33,34,35]

- A 1992 study conducted by the National Highway Traffic Safety Administration (NHTSA) found an agreement rate of 84.7% between DRE officers' conclusions and laboratory results.[36]
- However, the research is much less clear as to the accuracy of the procedure in assisting officers to correctly determine the class of drug(s) a person has consumed—that is, unless the procedure is accompanied by a blood test (or other test of a specimen sample of body fluids).
- The 1992 NHTSA study reported an overall agreement rate of 64.1% for the correct class of drug with agreement rates ranging widely from 16.7% to 70.5% depending on the type of drug.[37]
- Guilty verdicts are more likely when laboratory results confirm the presence of drugs.[38]
- The NHTSA study found that the DRE procedure was used less than might be expected given the number of officers trained in the U.S. states that were studied.[39]
- This study also found that the use of the DRE process drops off significantly over time, suggesting the need for sufficient funding and administrative infrastructure to support ongoing training and quality control for officers.

What options are available to police and the courts to deal with those who use drugs and drive in Canada?

- In principle, the options available to authorities to deal with individuals who engage in drug-impaired driving are similar to those applied to those who drink and drive. These include:
    - Roadside suspensions (12- or 24-hour licence suspensions for drivers who have used drugs, but who are not sufficiently impaired to warrant criminal charges)
    - Impounding of offender's vehicle or licence plates
    - Criminal prosecution
    - Drug treatment courts
    - Prevention programs
    - Treatment programs
    - Electronically monitored home confinement.

- Criminal sanctions for drug-impaired driving in Canada consist of the following:
    - Fines
    - Driving prohibitions
    - Incarceration (provincial jail or federal prison)
    - Incarceration and treatment
    - Unsupervised probation
    - Supervised probation
    - Intensive supervision (probation)
    - Home confinement (electronically monitored)
    - Community service orders
    - Licence restriction
    - Licence suspension.

    In addition, provinces can impose further sanctions:

    - Licence suspensions
    - Vehicle impoundment
    - Withholding of licence plates
    - Ignition interlock devices.

How effective is treatment for those who drive under the influence of drugs and who have a substance abuse problem?

- Currently, very few studies have addressed the effects of rehabilitation programs or treatment on drug-impaired driving. There is clearly a need for additional research in this area.
- Some studies show positive outcomes for treatment of individuals with drug problems (e.g., reductions in moving violations, drive-while-impaired convictions, and total number of post-treatment collisions).[40,41,42]
- Research indicates that well-designed prevention and treatment programs can positively influence knowledge and change beliefs, attitudes and health status, and can reduce recidivism and collisions among convicted offenders.[43]
- Evidence also indicates that education and treatment interventions are most effective when combined with licence suspension and other interventions designed to prevent the individual from driving (vehicle impoundment, ignition interlock devices, electronic monitoring).[44]
- Well-designed and carefully implemented programs that include a strong aftercare or maintenance component are the most effective in reducing the risk that an individual will engage in future instances of drug use and driving.

What are some of the characteristics of "best practice" or effective substance abuse treatment programs that could be applied to drugs and driving?

- To date, very little has been published on unique treatment approaches for drug-impaired driving. However, much is known about the characteristics of effective programs in both mainstream substance abuse treatment and treatment involving unique populations (e.g., criminal justice and corrections clients), and this knowledge may have direct application to the treatment of individuals who drive while impaired by drugs other than alcohol. [45,46]
- Three principles are key to determining the development of an appropriate treatment response:

    1. Intensive intervention services should be reserved for those individuals who are assessed as being "high risk" for further drug-impaired driving. In general, high-risk cases respond better to intensive services than low-risk cases. Moreover, limiting costly, intensive and lengthy intervention services to only those who clearly need them is both economically and ethically sound.
    2. Treatment should be uniquely designed to address the needs of this client group (i.e., those who drive under the influence of drugs). These needs may be changed through treatment.
    3. Treatment should be designed to respond to the attitudes, values, cognitive style, learning style, etc. of those persons who participate.

- Recent research and contemporary theory have identified a number of specific treatment techniques and components that are associated with significant reductions in post-treatment substance use.[47] Presumably, these techniques and approaches are applicable to the context of treatment for drug-impaired driving because they address the roots of a person's substance use and abuse behaviours.

    - Community Reinforcement Treatment
    - Relapse Prevention
    - Behavioural Self-Control Training
    - Behavioural Contracting
    - Marital Therapy
    - Social Skills Training
    - Stress Management
    - Brief Motivational Counselling
    - Pharmacotherapies (e.g., disulfiram, naltrexone, methadone).

- Finally, recent work in the British and Canadian prison services has resulted in the development of a framework against which substance abuse programs can be evaluated for likely effectiveness.[†] The framework includes the following key program characteristics:
    - Is founded on theory that is evidence-based
    - Uses effective methods, techniques, and modalities
    - Is multi-faceted and incorporates different treatment modalities
    - Provides appropriate intensity to respond to participants' needs (low to high severity of drug use)
    - Is delivered consistently and according to the program's design (program integrity)
    - Uses well-trained staff, recruited according to selection criteria, certified, monitored and supported
    - Has management support, including sufficient financial resources to sustain program delivery
    - Provides a supportive treatment environment
    - Uses proper assessment and selection of participants
    - Has comprehensive evaluation and monitoring infrastructure.

- Importantly, unique intervention and service models are needed for women, ethnic minorities (including Aboriginal and First Nations peoples) and younger people. While basic treatment concepts and techniques such as relapse prevention and motivational interviewing are relatively universal, treatment programs for drug-impaired driving designed for white, middle-aged male participants may not be suitable for these populations. Indeed, the pathways to substance abuse, the reasons for continuing to use and drive, the health consequences of using, and the ways of seeking help are known to be quite different for these populations.[48,49,50,51]

[†] This basic model for evaluating the likely effectiveness of substance abuse treatment programs has been adopted beyond the context of corrections-based treatment. Indeed, the European Association for the Treatment of Addiction has incorporated many of these characteristics in their program accreditation procedures currently being piloted in the United Kingdom.

Endnotes

The author would like to thank Doug Beirness, Robert Mann, Evan Graham and various staff from Health Canada for their constructive comments and input to an earlier version of this document. Any errors or omissions are solely the responsibility of CCSA.

[1] Criminal Code of Canada. Statutes of Canada. (1985), c.46.

[2] Beirness, D. J., Simpson, H. M., & Desmond, K. (2003). The Road Safety Monitor 2002: Drugs and Driving. Ottawa: Traffic Injury Research Foundation.

[3] Beirness, D. J., et al. (2003).

[4] Beirness, D. J., et al. (2003).

[5] Centre for Addiction and Mental Health (2003). Cannabis Use and Driving Among Ontario Adults. CAMH Population Studies eBulletin, May/June, No. 20. www.camh.net/pdf/eb020_cannabisdriving.pdf.

[6] Weekes, J. R. (2005). Unpublished analysis of the Canadian Addiction Survey. Ottawa: Canadian Centre on Substance Abuse.

[7] Adlaf, E. M., & Paglia, A. (2003). Drug Use Among Ontario Students 1977-2003: OSDUS Highlights. Toronto: CAMH Research Document Series No. 14. http://www.camh.net/pdf/~OSDUS03-Highlights%20Drug%20Report_Final.pdf.

[8] Dussault, C., Brault, M., Bouchard, J., & Lemire, A. M. (2002). The contribution of alcohol and other drugs among fatally injured drivers in Quebec: Some preliminary findings, in Mayhew, D. R., & Dussault, C. (Eds.), Proceedings of the 16th International conference on alcohol, drugs, and traffic safety (p. 423-430). Quebec: Société de l'assurance automobile du Québec.

[9] Cimbura, G., Lucas, D. M., Bennett, R. C., Warren, R. A., & Simpson, H. M. (1982). Incidence and toxicological aspects of drugs detected in 484 fatally injured drivers and pedestrians in Ontario. *Journal of Forensic Sciences, 27,* 855-867.

[10] Mercer, G. W., & Jeffrey, W. K. (1995). Alcohol, drugs, and impairment in fatal traffic accidents in British Columbia, *Accident Analysis and Prevention, 27,* 335-343.

[11] Brault, M., Dussault, C., Bouchard, J., & Lemire, A. M. (2004). The contribution of alcohol and other drugs among fatally injured drivers in Québec: Final results. Cited in D. Beirness (2005). Drugs and driving. In Canadian Centre on Substance Abuse. (2005). Substance abuse in Canada: Current challenges and choices. Ottawa: Canadian Centre on Substance Abuse.

[12] Stoduto, G., Vingilis, E., Kapur, B. M., Sheu, W-J., McLellan, B. A., & Liban, C. (1993). Alcohol and drug use among motor vehicle collision victims admitted to a regional trauma unit: Demographics, injury, and crash characteristics. *Accident Analysis and Prevention, 25,* 411-420.

[13] Beirness, D. J., et al. (2003).

[14] Cimbura, G., et al. (1982).

[15] Mercer, G. W. & Jeffrey, W. K. (1995).

[16] Blows, S., Ivers, R. Q., Connor, J., Ameratunga, S., Woodward, M., & Norton, R. (2005). Marijuana use and car crash injury. *Addiction, 100,* 605-611.

[17] Cimbura, G., Luca, D. M., Bennett, R. C., & Donelson, A. C. (1990). Incidence and toxicological aspects of cannabis and ethanol detected in 1,394 fatally injured drivers and pedestrians in Ontario (1982-1984). *Journal of Forensic Sciences, JFSCA, 35,* 1035-1041.

[18] Chesher, G. B. (2003). Cannabis and road safety: An outline of the research studies to examine the effects of cannabis on driving skills and actual driving performance, www.druglibrary.org/schaffer/MISC/driving/driving2.htm.

[19] Poyser, C., Makkai, T., Norman, L., & Mills, L. (2002). Drug driving among police detainees in three states of Australia. Canberra, Australia: Commonwealth Department of Health and Ageing.

[20] Cimbura, G., et al. (1982).

[21] Dussault, C., et al. (2002).

[22] Walsh, G., & Mann, R. (1999). On the high road: Driving under the influence of cannabis in Ontario. *Canadian Journal of Public Health, 90,* 260-263.

[23] Beirness, D. J., et al. (2003).

[24] Adlaf, E. M., Mann, R. E., & Paglia, A. (2003). Drinking, cannabis use and driving among Ontario students. *Canadian Medical Association Journal, 168,* www.cmaj.ca/cgi/content/full/168/5/565

[25] Poulin, C. (2002). Nova Scotia Student Drug Use 2002: Technical Report. Halifax: Nova Scotia Department of Health.

[26] CESAR FAX (2005). One-fifth of underage youth have driven under the influence of alcohol or illicit drugs. Center for Substance Abuse Research, University of Maryland, 14(4).

[27] Walsh, G., & Mann, R. (1999).

[28] Graham, E. (2004). The Drug Recognition Expert Program in Canada. Ottawa: Royal Canadian Mounted Police

[29] Page, T. E. (1998). The Drug Recognition Expert (DRE) response to the drug impaired driver: An overview of the DRE program, officers, and procedures. Los Angeles: Los Angeles Police Department.

[30] Graham, E. (2004).

[31] Department of Justice. (November 1, 2004). News release: New measures to strengthen enforcement of drug-impaired driving. Ottawa: Department of Justice. www.canada.justice.gc.ca/en/news/nr/2004/doc_31278.html

[32] Bigelow, G. E., Bickel, W. E., Roache, J. D., Liebson, I. A., & Nowowieski, P. (1985). Washington, D.C.: U.S. Department of Transportation, National Highway Traffic Safety Administration.

[33] Preusser, D. F., Ulmer, R. G., & Preusser, C. W. (1992). Evaluation of the impact of the drug evaluation and classification program on enforcement and adjudication. Washington, D.C.: U.S. Department of Transportation, National Highway Traffic Safety Administration.

[34] Bigelow, G. E., et al. (1985).

[35] Compton, R. P. (1986). Field evaluation of the Los Angeles Police Department drug detection procedure. Washington, D.C.: U.S. Department of Transportation, National Highway Traffic Safety Administration.

[36] Preusser, D. F., et al. (1992).

[37] Preusser, D. F., et al. (1992).

[38] Preusser, D. F., et al. (1992).

[39] Preusser, D. F., et al. (1992).

[40] Mann, R. E., Anglin, L., Rahman, S., Blessing, L. A., Vingilis, E. R., & Larkin, E. (1995). Does treatment for substance abuse improve traffic safety? A preliminary evaluation. Paper presented at the 13th International Conference on Alcohol, Drugs and Traffic Safety, Adelaide, Australia. Cited in Health Canada (2004). Best Practices: Treatment and rehabilitation for driving while impaired offenders. Ottawa: Health Canada.

[41] Chipman, M., Macdonald, S., & Mann, R. (2003). Being "at fault" in traffic crashes: Does alcohol, cannabis, cocaine or polydrug abuse make a difference? *Injury Prevention, 9,* 343-348.

[42] Macdonald, S., DeSouza, A., Manne, R. E., & Chipman, M. (2004). Driving behaviour of alcohol, cannabis and cocaine abuse clients and population controls. *American Journal of Drug and Alcohol Abuse, 30,* 429-444.

[43] Health Canada. (2004). Best Practices: Treatment and rehabilitation for driving while impaired offenders. Ottawa: Health Canada.

[44] Health Canada. (2004).

[45] Andrews, D. A. (1995). The psychology of criminal conduct and effective correctional treatment. In J. McGuire (Ed.), What works: Reducing reoffending. New York: Wiley.

[46] Andrews, D. A., Bonta, J., & Hoge, R. (1990). Classification for effective rehabilitation: Rediscovering psychology. *Criminal Justice and Behavior, 17,* 19-52.

[47] Roberts, G., Ogborne, A., Leigh, G., & Adam, L. (1999). Best practices: Substance abuse treatment and rehabilitation. Ottawa: Health Canada.

[48] National Center on Addiction and Substance Abuse. (2003). The formative years: Pathways to substance abuse among girls and women ages 8-22. New York: CASA.

[49] Cormier, R. A., Dell, C. A., & Poole, N. (2003). Women and substance use problems. Ottawa: Women's Health Surveillance Report, Canadian Institute for Health Information.

[50] Canadian Human Rights Commission. (2003). Protecting their rights: A systemic review of human rights in correctional services for federally-sentenced women. Ottawa: Canadian Human Rights Commission.

[51] Dowden, C., & Blanchette, K. (2002). An evaluation of the effectiveness of substance abuse programming for female offenders. *International Journal of Offender Therapy and Comparative Criminology, 46,* 220-230.

The Canadian Centre on Substance Abuse (CCSA), Canada's national addictions agency, was established in 1988 by an Act of Parliament. CCSA provides a national focus for efforts to reduce health, social and economic harm associated with substance abuse and addictions.

For further information, please write:

Canadian Centre on Substance Abuse
Suite 300, 75 Albert St., Ottawa, ON K1P 5E7
Tel.: (613) 235-4048; fax (613) 235-8101. Visit our website at www.ccsa.ca

ISBN 1-896323-72-3

Prepared by the Canadian Centre on Substance Abuse