Psychoactive Substances in Canada
Levels of Harm and Means of Reduction

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This paper describes a public-health perspective on drugs in Canada and on strategies to reduce the harm from drugs. The frame for the discussion is psychoactive substances in general, including licit as well as illicit drugs. Issues of public health are not the only considerations in drug policy, of course. Drugs can also have an impact on such arenas as public order and quality of life. But health consequences of drug use, broadly construed—including not only mental and physical health but also casualties and disabilities—are a major consideration in drug policy and have been a primary justification for prohibitory policies.

Current health burden of drug use

Recent work by the World Health Organization has re-emphasized the importance of psychoactive substances as a risk factor in disease, death, and disability. The recent study of the Global Burden of Disease estimated that, for the world as a whole, drugs are a risk factor accounting for 6.7 percent of the total burden of lost disability-adjusted life-years (DALYs). However, about nine-tenths of this loss is accounted for by two drugs that are legal in Canada, alcohol and tobacco. Of the total global loss of DALYs, 3.5 percent are estimated to be due to alcohol, 2.6 percent to tobacco, and 0.6 percent to all illicit drugs taken together. In the group of Established Market Economies, including Canada, almost one-quarter of lost DALYs are accounted for by drugs: 10.3 percent is attributed to alcohol, 11.7 percent to tobacco, and 2.3 percent to illicit drugs (Murray and Lopez 1996: 311–14).

The Canadian study directed by Eric Single of the economic cost of drugs included measurement of the direct costs of illness due to alcohol, tobacco, and drugs in Canada (Single et al. 1996). The most detailed information on costs in the health-service system was available for Ontario. Costs to the Ontario health system of all drugs taken together were very substantial: an estimated $1.554 billion in 1992. Of these costs, 69.0 percent were attributable to tobacco, 28.4 percent to alcohol, 0.5 percent to marijuana, and 2.0 percent to all other illicit drugs (recalculated from Xie, Rehm, Single and Robson 1996 and Addiction Research Foundation 1997).

Many of these costs, particularly for tobacco, occur to patients at relatively advanced ages. But, drug policy is probably driven more by concerns about disease, disability, and death among youth. The Ontario cost-of-illness study (Xie et al. 1996) shows that among youth, also, it is legal drugs—legal at least for those beyond their eighteenth or nineteenth birthday—that predominate in hospitalizations and deaths. But, whereas

tobacco ranks first in health costs and years of life lost over the whole lifespan, it is alcohol that predominates for those under age 25 (see table 1). Alcohol accounts for 69 percent of the drug-related days of hospital stay among youth 10 years to 19 years old, and 61 percent of the days among youth 20 years to 24 years old. Among youth 10 years to 19 years old, tobacco accounts for 22 percent and illicit drugs for 9 percent of the hospital days; among youth 20 years to 24 years old, the respective figures are 26 percent and 13 percent.

In terms of person-years of life lost from deaths at a young age, alcohol is even more predominant, accounting for 87 percent of the years lost by those between 10 and 19 years of age and 85 percent by those between 20 and 24 years of age. For deaths in these age groups, illicit drugs (9 percent of the years lost in each age-group) outrank tobacco (4 percent for those between 10 and 19 years of age, 6 percent for those between 20 and 24 years of age).

Alcohol, tobacco, and illicit drugs, thus, all cause substantial harm to the health of young people, both in the short term and in the longer term. By a very substantial margin, alcohol accounts for the greatest immediate harm to young people. In terms of the longer-term outcomes of youthful habits, if they are continued, tobacco also holds a prominent place.

Table 1   Indicators of harm to health from alcohol, tobacco, and drugs for youth and the total population in Ontario, 1992: Days of hospital stay, and person-years of life lost

	10 years to 19 years			20 years to 24 years			All Ages		
	Male	**Female**	**Total**	**Male**	**Female**	**Total**	**Male**	**Female**	**Total**
Days of Hospital Stay									
Alcohol	6,506	4,093	10,599	9,461	3,986	13,447	225,847	109,184	335,031
Tobacco	1,397	1,932	3,329	1,841	3,837	5,678	596,414	411,233	1,007,647
Illicit Drugs	1,156	292	1,448	1,994	864	2,858	11,258	6,906	18,164
Person-Years of Life Lost from Deaths in the Age Group									
Alcohol	3,999	1,485	5,484	4,643	1,088	5,731	44,942	16,805	61,747
Tobacco	182	73	255	230	202	432	109,801	61,642	171,443
Illicit Drugs	321	115	436	483	80	563	7,752	1,532	9,284

Source: Xie, Rehm, Single and Robson 1996.

These figures are, of course, based on current patterns of use. With different drug policies, patterns of use and of harm might be expected to change. The experience with partial decriminalization of marijuana in the United States in the 1970s was that it did not make a detectible difference in use patterns (Single 1989). On the other hand, the general experience when drugs are legally available for recreational use is that the conditions and extent of availability affect rates of drug use and of drug-related problems. In particular, consumption tends to rise when the price falls and when the drug is sold in more places or for longer hours (Edwards et al. 1994).

It is impossible to estimate with any accuracy what would happen if presently illicit drugs were legalized and made more available. Rates of consumption and problems would probably rise, and the number of heavy users would probably increase, though it is unclear by how much and would depend, in any case, on the specific policy regime. The international experience with alcohol and tobacco suggests that there is some upper limit at which a population is "saturated," in the sense that societal reactions hold down any further increase in use and that the reactions may, indeed, bring a decline in use (Room 1989). On the other hand, experience with alcohol and tobacco also suggests that, for a socially acclimated drug, the saturation level may carry with it very substantial levels of harm to health.

Harms from heavy use in a comparative framework

We can go one small step forward down this path of envisioning possible futures by considering what the harmful effects of different drugs are for heavy users of each drug. Table 2 shows a qualitative assessment of the main adverse effects of regular use of the most harmful form of each type of drug, as commonly used for nonmedical purposes (Hall, Room and Bondy 1999). For tobacco and marijuana, this means the smoked form; for alcohol, distilled spirits; for opiates, injected heroin. The table distinguishes roughly between effects that are important (marked **), in terms of the number of heavy users who are affected, and effects that are less well-established or less important numerically (marked *). The table focuses on adverse health consequences of use, and does not consider any potential beneficial health effects.

As the case of nicotine exemplifies, the harm from heavy use may come primarily from factors other than the psychoactive component itself. It is the tar and carbon monoxide in smoked tobacco and not the nicotine itself which are the chief sources of health harm. The harm may thus be largely prevented if the user switches to a "cleaner" method of ingesting nicotine. Similarly, some harms from marijuana and from heroin can be avoided by switching to safer methods of use. In this aspect, the table describes an upper limit on health harms from heavy use of the drug.

Table 2   A summary of adverse effects on health for heavy users of the most harmful common form of each of four drugs

	Marijuana	Alcohol	Tobacco	Heroin
Traffic and other accidents	*	**		*
Violence and suicide		**		
Overdose death		*		**
HIV and liver infections		*		**
Cirrhosis of the liver		**		
Heart disease		*	**	
Respiratory diseases	*		**	
Cancers	*	*	**	
Mental illness	*	**		
Dependence and addiction	**	**	**	**
Lasting effects on the fetus	*	**	*	*

Legend: ** = important effect; * = less common or less well-established effect.
Source: Hall, Room, and Bondy 1999.

The table illustrates that the profile of health harm varies quite considerably for different drugs. Adverse health consequences can result from a single occasion of use or can be the long-term result of chronic use. The predominant types of harm also vary for different ages. Some chronic effects—cirrhosis of the liver, heart disease, and cancer—are primarily diseases of the middle-aged and elderly. On the other hand, the first four categories in the table (traffic and other accidents, violence and suicide, overdose death, and HIV and liver infections) are all important potential consequences for young people. In terms of young lives lost, accidents and violence related to alcohol are by far the most important of these categories. Smoking both of tobacco and of marijuana can worsen respiratory diseases. For young people, this is the most important immediate health concern for tobacco. Along with traffic casualties, respiratory diseases are also the most immediate health concern for marijuana, which is presently mostly smoked by the young. Overdose and infections from injection equipment are a concern with respect to injectors of heroin or other drugs.

The last line of the table indicates that heavy or frequent use of any psychoactive substance is of concern during pregnancy. Drug dependence is also a concern for a person using any of these substances regularly and heavily.

As noted above, the harms from drug use are often attributable to factors other than the psychoactive substance itself. There is thus room for argument whether dependence or addiction *per se* is a harm in itself: in what sense does someone wearing a nicotine patch every day suffer harm from it?

Addiction is, however, a relevant consideration where the harms arise from the psychoactive substance itself, as with alcohol, or are intrinsic to customary forms of non-medical use. On the basis of experimental and other data, more detailed judgements can be made than the crude summary in table 2 about the relative propensity of different drugs to produce important effects relevant to addiction. Table 3 shows a summary of the rankings given by two American experts, Neil Benowitz and Jack Henningfield, on five dimensions relevant to the capacity of the drug to result in addiction and intoxication (summarized from Hilts 1995). It will be noted that alcohol, tobacco, and heroin each rank highest on one or two of the dimensions, while marijuana ranks near the bottom on each dimension.

Table 3   Comparative ratings of the potential of marijuana, alcohol, tobacco and heroin to cause dependance (1 = highest rank)

	Marijuana	Alcohol	Tobacco	Heroin
Withdrawal: presence and severity of symptoms from withdrawal	4	1	3	2
Reinforcement: capacity to get human or animal users to use again and again, in preference to other substances	4	2	3	1
Tolerance: how much more needed by a regular user to get the same effect	4	3*	2*	1
Dependence: difficulty quitting and avoiding relapse, perceived need to use, use persisting despite harm	4	3	1	2
Intoxication: impairment of motor abilities, distortion of thinking and mood	3	1	4	2

* minor disagreement in rankings
Source: Neil Benowitz and Jack Henningfield, summarized from Hilts 1995.

As I have noted, if presently illicit drugs were legalized, the rates of consumption and the number of heavy users would depend very much on how the drugs were regulated and, in any case, cannot be predicted accurately. On the basis of tables 2 and 3, it does not appear that, under any likely future Canadian control regime for the legalization of presently illicit drugs, these drugs would match the current level of harm to health from alcohol and tobacco.

Strategies for reducing the harm

To simplify somewhat, there are five main strategies for governmental action in preventing harm from drug use (Room 1974). One strategy is to educate or persuade people not to use a substance or to use it without harm. A second strategy is to regulate the availability of the substance or the conditions of its use. A third strategy is to insulate the use from harm in one way or another. A fourth strategy is to treat people who are in trouble one way or another with their drug use. And, a fifth strategy is to prohibit use.

The effectiveness of the fifth strategy, prohibition, is discussed in other chapters of this book. I shall summarize the state of the literature on the effectiveness of each of the other four strategies.

(1) Education and persuasion

Education or persuasion is an ever-popular strategy for preventing drug problems. There is by now a very substantial literature and increasingly sophisticated methodologically evaluating the effects of educational and persuasional approaches. The literature has two main constraints. First, it is mostly about educating or persuading teenagers or children, primarily in a school context. And, second, it is very much dominated by studies from the United States. Given these two characteristics, the literature is mostly about efforts to persuade teenagers not to use alcohol, tobacco, or drugs (Beck 1998).

Despite the best efforts of a generation of educators and educational researchers, the overall picture of effectiveness of this strategy is not positive: instances of demonstrated success in differentially changing drug-using behaviour are few and far between (Paglia and Room 1999). Where there have been successes, they have been primarily where changes in the larger society, such as the decline in the acceptability of adult smoking in the 1980s, created a favourable environment for changing teenage behaviour.

Whatever the evaluation literature may conclude, however, school-based drug education will continue. In this circumstance, drug education curricula might well be based on general educational principles rather than framed by ideology on drug use. Students are citizens and potential future consumers and, with respect to these roles, it is appropriate

to provide them with biological and social-science information about the use and problems of tobacco, alcohol, and drugs (including for prescription drugs) and to encourage discussion of the intellectual, practical, and ethical issues these problems raise.

(2) Treatment

As have many other developed societies, over the last half-century Canada has built a substantial system dedicated to treating alcohol and drug problems (Rush and Ogborne 1992). Much treatment also goes on elsewhere in the health system, including in the family physician's office. Reflecting in part the large American presence also in this literature, the official goal of most modes of treatment that have been evaluated is lifelong abstinence. Treatment is not very successful in achieving this goal: for example, in the RAND follow-up study of alcoholism treatment just 7fi percent of the cases had abstained throughout a follow-up period of 4fi years (Polich, Armor, and Braiker 1981). In terms of less absolute outcomes, treatment for alcoholism or drug dependence is consistently able to show positive effects. But, the effects tend to be relatively modest—improvement rates in terms of drinking or drug use or of associated problems for any given episode of treatment are usually at the level of 20 percent or so higher than the rate of untreated remissions. It is in recognition of this that the current treatment-oriented literature talks of addiction as a "chronic relapsing condition."

There has been one major exception to the abstention goal in American drug treatment, methadone maintenance. Here the continued use of an opiate is accepted and the focus is on reducing harm to the user and crime in the society. Studies of methadone maintenance are consistently able to show success in achieving these goals. On the same principle, nicotine-replacement therapies, with an acceptance of long-term maintenance, may well be a path forward in reducing the harm from tobacco smoking (Ferrence et al. 2000).

Providing effective treatments for alcohol and drug problems is an obligation of a just and humane society. By itself, however, providing treatment is not an adequate policy for reducing rates of alcohol and drug problems in a society. Success rates in treatment are not high enough to keep up with the potential supply of new cases.

(3) Insulating use from harm

The idea of insulating use of alcohol from harm is well developed (Moore and Gerstein 1981). Countermeasures to drinking and driving are the prime example, encompassing a variety of approaches to reducing alcohol-related traffic casualties without necessarily stopping or reducing alcohol use. Indeed, our general societal strategy for reducing alcohol-related problems has relied increasingly on enclaving or otherwise separating heavy-drinking occasions from harm either to the drinker or to those around

the drinker. This approach has been used with other drugs primarily in the context of treatment in the form of methadone or nicotine replacement therapies. Needle exchanges for drug users who ingest via injection are another example of a strategy for insulating drug use from harm.

Given the diversity of approaches and techniques involved in this general strategy, no general conclusions can be drawn about the strategy's effectiveness. Experience of recent decades with countermeasures to drinking and driving shows that, in the right circumstances, substantial reductions in harm can be achieved by this strategy.

(4) Regulating the availability and conditions of use

In terms of the substantial harms to health and public order they can cause, psychoactive substances are not ordinary commodities. Governments have thus long actively intervened in the markets for drugs as commodities, far beyond usual levels of state intervention in markets.

Total prohibition can be viewed as an extreme form of regulation of the market. In this circumstance, where no one is licensed to sell the commodity, the state has no formal control over the conditions of the sales that nevertheless occur and there are no legal sales interests, controlled through licensing, to cooperate with the state in the market's regulation.

Marijuana is one of few drugs that are totally prohibited in Canada. Most other drugs that we think of as illicit are also available legally through a highly regulated and restrictive system, the prescription system, which is a kind of rationing system, with the state assigning the power to give or withhold a drug ration to health-care professionals (the doctor and the pharmacist). It is a system that is highly intrusive on personal privacy and the consumer's sovereignty and, in these respects, it is quite astonishing how little complaint the system has drawn from advocates of the free market, the sovereignty of the consumer, and less powerful government. The prescription system, when rigorously applied, has often proved a very effective way of controlling use and problems from use.

Associated with the prescription system in Canadian practice are two lesser levels of restriction upon availability: restriction of sales to pharmacies and restriction to sales "behind-the-counter" in pharmacies. Formal evaluations are scarce but these restrictions, too, seem to have had some success in reducing drug-related harm.

One curiosity of the situation in Canadian is worth mentioning: Canadians have the highest per-capita use in the world of codeine, an opiate that is subject to the international control regime. Formulations of codeine are widely available in Canada without

a prescription. There are certainly problems associated with codeine use—often from overconsumption of the accompanying aspirin or acetaminophen—but the widespread use of this opiate causes little visible trouble and attracts little public attention.

Reflecting the severe problems of health and social disruption often associated with it, alcohol has long been treated as a commodity in a class by itself throughout Canada and the United States. For 70 years or so, there has been a "Canadian model" of alcohol control (Room 1996) with a specific licensing system for drink-sellers, restricted hours and days of sale, relatively high taxes or mark-ups, and retail sales of some alcoholic beverages conducted by the government in a limited number of stores. Some features of this Canadian model were widely applied also in American states.

There is by now a well-developed literature evaluating the effectiveness of such restrictions on the availability of alcohol in reducing rates of alcohol-related problems. Ironically, the development of this literature has been made possible, in the main, by the gradual process of dismantling the restrictions on availablity in the Canadian model and similar systems. The literature shows quite definitively that these kinds of restrictions on availablility can reduce rates of alcohol-related problems (Edwards et al. 1994).

Conclusion

There are substantial harms to the health of Canadians from a wide variety of psychoactive substances. At present, levels and patterns of use, the harms to health from alcohol and tobacco greatly exceed the harms from illicit drugs. Depending on the control structure adopted, legalization of illicit drugs might increase rates of harm from the drugs but probably not to the present level of harms from alcohol and tobacco.

Education and treatment are the two strategies that most commonly come to mind in public discourse about reducing drug-related harms. But, the literature suggests that educational approaches are relatively ineffective in reducing rates of drug use. Treatment of drug problems does show some positive effects but treatment is relatively ineffective in reducing the overall rates of drug-related problems in the population. Education and treatment are good things for a society and a government to be doing about drug problems but they do not constitute in themselves a public-health policy on drugs.

The literature supports the effectiveness of two other strategies for reducing drug-related harms. One of these goes by a variety of names, including an "environmental approach to prevention," "reducing environmental risk," and "harm reduction." It is termed here "insulating use from harm." Not all approaches that fall under this rubric are always successful but there is a strong record of accomplishment with this strategy, particularly with alcohol.

Another strategy of proven effectiveness is regulation of the availability and conditions of use. While prohibition can be regarded as the extreme end of regulation, market regulation as discussed here only becomes possible when at least some use of the drug is legalized. The prescription system and the alcohol-control system are current examples in Canada of systems for regulating the market that effectively reduce rates of drug-related problems. As these examples indicate, there is an irony to be faced by libertarians who favour drug legalization: legalizing sales of a drug tends to increase rather than decrease the state's involvement in the market.

References

Addiction Research Foundation. (1997). *Cannabis, Health and Public Policy*. Toronto: Addiction Research Foundation.

Beck, J. (1998). 100 Years of "Just Say No" versus "Just Say Know." *Evaluation Review* 22: 15–45.

Edwards, G., P. Anderson, T.F. Babor, S. Casswell, R. Ferrence, N. Giesbrecht, C. Godfrey, H.D. Holder, P. Lemmens, K. Mäkelä, L.T. Midanik, T. Norström, E. Österberg, A. Romelsjö, R. Room, J. Simpura, and O.-J. Skog (1994). *Alcohol Policy and the Public Good*. Oxford: Oxford University Press.

Ferrence, R., J. Slade, R. Room, and M. Pope, Eds. (2000). *Nicotine and Public Health*. Washington, DC: American Public Health Association.

Hall, W., R. Room, and S. Bondy (1999). Comparing the Health and Psychological Risks of Alcohol, Cannabis, Nicotine and Opiate use. In H. Kalant, W. Corrigall, W. Hall, and R. Smart (Eds.), *The Health Effects of Cannabis*. Toronto, ON: Addiction Research Foundation division, Centre for Addiction and Mental Health: 477–506.

Hilts, P.J. (1995) Rating Addictiveness. *The Journal* (Toronto) 24, 1: 12.

Moore, M.H., and D.R. Gerstein, eds. (1981). *Alcohol and Public Policy: Beyond the Shadow of Prohibition*. Washington, DC: National Academy Press.

Murray, C.J.L., and A. Lopez (1996). Quantifying the Burden of Disease Attributable to Ten Major Risk Factors. In C.J.L. Murray and A. Lopez (Eds.), *The Global Burden of Disease: A Comprehensive Assessment of Mortality and Disability from Diseases, Injures and Risk Factors in 1990 and Projected to 2020*. Cambridge, MA: Harvard University Press: 295–324.

Paglia, A., and R. Room (1999). Prventing Substance Use Problems among Youth: A Literature Review and Recommendations. *Journal of Primary Prevention* 20: 3–50.

Polich, J.M., D.J. Armor, and H.B. Braiker (1981). *The Course of Alcoholism: Four Years after Treatment*. New York: Wiley.

Room, R. (1974). Minimizing Alcohol Problems. *Alcohol Health and Research World* (preview issue): 12–17.

Room, R. (1989). Drugs, Consciousness and Self-control: Popular and Medical Conceptions. *International Review of Psychiatry* 1: 63–70.

Room, R. (1996) Introduction. In R.G. Smart and A.C. Ogborne, *Northern Spirits: A Social History of Alcohol in Canada*. Toronto: Addiction Research Foundation: xi–xvi.

Rush, B.R., and A.C. Ogborne (1992). Alcoholism Treatment in Canada: History, Current Status, and Emerging Issues. In H. Klingemann, J.-P. Takala, and G. Hunt (eds.), *Cure, Care or Control: Alcoholism Treatment in Sixteen Countries*. Albany, NY: State University of New York Press: 253–67.

Single, E. (1989). The Impact on Marijuana Decriminalization: An Update. *Journal of Public Health Policy* 10: 456–66.

Single, E., L. Robson, X. Xie, and J. Rehm (1996). *The Costs of Substance Abuse in Canada*. Ottawa: Canadian Centre on Substance Abuse.

Xie, X., J. Rehm, E. Single, and L. Robson (1996). *The Economic Costs of Alcohol, Tobacco and Illicit Drug Abuse in Ontario: 1992*. Research Document No. 127. Toronto: Addiction Research Foundation.

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