

Alcohol Related Injury

Evidence-Based Practice
Synthesis Document

November 2008



Ontario Injury Prevention
Resource Centre

The Ontario Injury Prevention Resource Centre at SMARTRISK would like to gratefully acknowledge the invaluable contribution of the expert reviewers and advisory group members to this document.

Funding for this document provided through the Ontario Ministry of Health Promotion and the Ontario Public Health Association. The views expressed in this document are the views of the Ontario Injury Prevention Resource Centre at SMARTRISK and do not necessarily reflect those of the Ontario Ministry of Health Promotion or the Ontario Public Health Association.

ISBN 0-7794-3929-5

© Queen's Printer for Ontario

Table of Contents

Introduction	3
Purpose	3
Structure	3
Magnitude of the Problem	4
The Burden of Substance Use in Ontario	4
Alcohol and Injuries	4
Age and Gender Differences	6
Males and Alcohol	6
Youth and Alcohol	6
Other Substances	8
At Risk Populations	8
Data Limitations	8
Risk Factors	10
Alcohol and Other Drugs as a Risk Factor in Injury	10
Self-Injury	10
Violence	12
Impaired Driving	12
Other Unintentional Injuries	14

Falls	14
Sports and Recreation	14
Fire	14
Psychological Risk Factors for High Risk Substance Use	15
Role of Alcohol Policy and Social Environment	15
Evidence-Informed Practice Recommendations	16
What Do We Know?	16
Components of a Comprehensive Approach	18
Putting Alcohol Priorities on the Agenda	18
Policy and Enforcement Initiatives	19
Education and Awareness	20
Reorientation of Services	22
Conclusion	22
Implementation and Evaluation	23
Evaluation of Prevention Initiatives	23
Implementation of evidence informed practice recommendations	25
References	28

Introduction

Purpose

The purpose of this document is to inform Ontario public health professionals and their community partners of evidence-informed practice in Alcohol Related Injury in preparation for the implementation of the *Prevention of Injury and Substance Misuse* standard of the new Ontario Public Health Standards and Protocols, released October 31, 2008.

This document is based upon earlier systematic literature reviews conducted by the Ontario Injury Prevention Resource Centre staff in 2007-2008. These reviews are available by request from the Resource Centre.

The model upon which this synthesis document is based is contained in Safe Kids Canada's (2006) *Safer Homes for Children: A Guide for Communities* report.

Structure

The report follows the general public health program planning stages and is divided into several sections. The first gives a brief overview of the magnitude of the issue of injuries associated with the use of alcohol and other substances. Un-

fortunately, however, due to limitations of data availability, it was necessary to use secondary reporting of data collected from other research studies. The second section briefly reviews what is known about substance use, primarily alcohol, as a risk factor for injury. Due to the magnitude and high percentage of harm associated with its use, the primary focus will be on alcohol, with other substances mentioned primarily as they relate to alcohol use and injury. It is well documented that risk of injury increases with increased alcohol use. The third section provides a synthesis of best available evidence for effective practices to reduce the consumption of alcohol and that have the potential to reduce or mitigate injuries resulting from its use. In keeping with the purpose of this document, this information is provided in bulleted recommendations, with minimal extraneous detail.

Magnitude of the Problem

The Burden of Substance Use in Ontario

According to the CAMH Monitor, 78.9% of Ontario residents reported consuming alcohol within the past 12 months; of those, 5.6% reported consuming alcohol on a daily basis. (Adlaf, E.M., Ialomiteanu, A. & Rehm, J., 2008) This ranks alcohol as, by far, the most prevalent drug* used in the province. In comparison, tobacco was consumed by 20.3% of the survey sample in the past year, 16.1% on a daily basis. Other drugs were reported as being used less frequently, with usage over the past 12 months ranging from 14.4% for cannabis, to 1.3% for cocaine and 1% for ecstasy. (Adlaf, E.M., Ialomiteanu, A. & Rehm, J., 2008) Research indicates that use of these substances has a significant role in the risk of injury. (Xie, X, et al., 1998)

While sometimes difficult to measure, it must be remembered that the greatest costs associated with substance use are human costs--costs to individual well-

being and relationships, social cohesion, family life, housing, education, employment, and chronic and acute health conditions. It is possible, however, as a proxy for these costs to measure the overall social cost of substance use. In Canada, this economic burden was estimated to be \$39.8 billion in 2002, corresponding to a cost of \$1,267 to each Canadian. The three largest costs in 2002 were attributed to: (Rehm J., , et al., 2006)

- ❖ Tobacco at \$17 billion (42.7%)
- ❖ Alcohol at \$14.6 billion (36.6%)
- ❖ Illegal drugs at \$8.2 billion (20.7%)

Alcohol and Injuries

In Ontario, it has been estimated that the injuries associated with alcohol use cost the province \$440 million each year. (SMARTRISK, 2006) This cost reflects only the direct health care costs associated with these injuries, and the indirect costs of lost productivity. This cost can be further broken down into: (SMARTRISK, 2006)

For more information on alcohol and injuries two well informed pieces of re-

*A drug is defined as any substance other than food/ water consumed in order to change the way the body and/or mind function. (Smyth & Caverson, 2007)

search to familiarize yourself with are; the Ontario Trauma Registry (CIHI, 2004/2005) and Reducing Alcohol-Related Harm in Canada: Toward a Culture of Moderation, Synopsis of a Proposed National Alcohol Strategy (Sawaka, E., et al., 2007).

- ❖ Injuries resulting from motor vehicle crashes involving alcohol at \$156 million.
- ❖ Injuries resulting from falls involving alcohol at \$117 million.
- ❖ Injuries resulting from acts of interpersonal violence involving alcohol at \$52 million.

It should be remembered that the figures above are a conservative estimate of the true economic burden of injuries associated with alcohol, as they cover only health and productivity costs from a societal perspective--thus many other potential costs such as policing, court costs, insurance payments, etc., are not included.

While the extent of the burden of injury associated with alcohol and drug use is reported in economic terms (i.e., mone-

tary cost) the magnitude and burden of injury can also be measured in the number of individuals affected. Several studies report injuries in terms of deaths and hospitalizations resulting from injuries associated with alcohol use. The main findings of these studies are as follows (Smythe, C., & Caverson, R., 2007):

- ❖ 29% of hospitalizations in lead trauma hospitals in 2000/2001 for major injuries were alcohol related.
- ❖ Of these, 54% were the result of motor vehicle crashes, 16% the result of falls, and 14% the result of interpersonal violence.
- ❖ Alcohol consumption was also associated with 39% of water related deaths between 1997-2001.
- ❖ Between 1995-2000, 31% of cycling hospitalizations had a positive BAC.
- ❖ Alcohol was found to be a factor in 40% of snowmobile deaths in 2000/2001.
- ❖ According to the Ontario Trauma Registry, alcohol or drugs were involved in 23% of motor vehicle collisions, 25% of homicides, 14% of suicides, and 7% of unintentional falls. (Cana-

dian Institute for Health Information, 2007)

- ❖ An American study estimates that half of all trauma patients are under the influence of alcohol at the time of their injury. (Borges, G., et al., 2003)

Age and Gender Differences

Males and females both use drugs and alcohol, although the frequency and patterns of use, as well as the physiological impacts, are often quite different for the two genders.

Males and Alcohol

According to the CAMH Monitor, males are more likely to: (Adlaf, E.M., Ialomiteanu, A. & Rehm, J., 2008)

- ❖ drink alcohol during the past year
- ❖ drink alcohol daily
- ❖ consume more drinks weekly
- ❖ exceed the low risk drinking guidelines (see Table 1).
- ❖ drink five or more drinks on a single occasion weekly
- ❖ drink hazardously or harmfully
- ❖ report alcohol problems
- ❖ report alcohol dependence symptoms
- ❖ report drinking and driving
- ❖ use cannabis during the past year
- ❖ report driving after using cannabis

Females are more likely to use use opioid pain relievers, stimulants, and over-the-counter sleeping medications for purposes other than sleeping. (Xie, X., , 1998)

Youth and Alcohol

Biennial surveys of Ontario students in grades 7-12 have yielded the following insights into substance use among the province's youth: (Adlaf, E.M. & Paglia-Boak, A., 2007)

- ❖ 61% of students report drinking alcohol within the past 12 months.
- ❖ Of these, 30% report drinking at a hazardous level (five or more drinks on a single occasion in the past four weeks).
- ❖ Unlike the general survey results reported above, amount consumed does not vary by gender in this sample. (27% of males and 25% of females report binge drinking)
- ❖ Alcohol use increases by approximately 10% with each grade. Frequency of hazardous drinking also

Table 1 - **Low Risk Drinking Guidelines** (Centre for Addiction and Mental Health, 2008)

- ❖ 0 : Zero drinks = lowest risk of an alcohol-related problem
- ❖ 2 : No more than 2 standard drinks on any one day
- ❖ 9 : Women: up to 9 standard drinks a week
- ❖ 14 : Men: up to 14 standard drinks a week
- ❖ One Standard Drink =13.6 g of alcohol
- ❖ 5 oz/142 mL of wine (12% alcohol)
- ❖ 1.5 oz/43 mL of spirits (40% alcohol)
- ❖ 12 oz/341 mL of regular strength beer (5% alcohol). Higher alcohol beers and coolers have more alcohol than one standard drink
- ❖ If you don't already drink, don't start for health reasons.
- ❖ If you do drink, avoid getting intoxicated or drunk.
- ❖ Wait at least one hour between drinks.
- ❖ Have something to eat. Drink non-alcoholic beverages, such as water, soft drinks or fruit juice

increases by grade from approximately 1% in grade 7 to 34% by grade 12.

- ❖ While the use of drugs and alcohol by Ontario youth has declined on average from 1977 to 2007, this decline has recently shown signs of flattening out—with the rates of use reported in 2007 being quite similar to those reported in 2005. Drinking and driving among licensed students remained stable at about 12% and continues to be a public health concern.

- ❖ Among all current drinkers, according to the 2005 *Canadian Addiction Survey* (CAS), 15 to 24 year olds have the highest rates of weekly and monthly heavy drinking. This group also has the highest rates of being harmed by drinking. (Chamberlain, E., & Solomon, R., 2006)

- ❖ According to the *Canadian Campus Survey*, 84% of Ontario college and university students report using alcohol in the previous year. Of those, 19% report drinking at a hazardous

level. (Adlaf, E.M., Demers, A. & Gliksman, L. (Eds.), 2005)

Other Substances

When one considers substances other than alcohol, different age patterns emerge. For example, the use of tranquilizers and sedatives increases substantially among older age groups, so that more than 10% of men and 20% of women over the age of 65 years report using some type of sedative medication. (Neutel, C.I., et al., 1996)

Conversely, many over the counter medications, such as cough syrups containing dextromethorphan or often used in combination with alcohol and other drugs by youth. (Council on Drug Abuse, 2008A) Young people also misuse prescription drugs, for example, 11% of surveyed students said it was easy or very easy to get prescription pain relievers such as OxyContin. (Adlaf, et. al., 2007, Council on Drug Abuse, 2008B)

At Risk Populations

According to the 1994 Canada's Alcohol and Other Drugs Survey, 72% of people aged 15 years and older reported drinking alcohol in the previous 12 months. Males and those with higher incomes

drink more than other Canadians. (Canadian Foundation for Drug Policy., 1998)

In addition to males and youth identified above as being high-risk alcohol users and thus at higher risk of injury, certain other groups in the Canadian population are more likely to engage in high-risk alcohol and drug use than others, and thus are at an increased risk for injury: the offender population, people with concurrent disorders, street youth, the homeless population, First Nations, older adults, and any experiencing stress, discrimination or disenfranchisement. (Smythe, C., & Caverson, R. , 2007)

Data Limitations

Planning an evidence informed practice solution for any injury problem requires an understanding of the problem to be addressed--who is getting hurt, how and why. Normally, provincial, regional or preferably local injury data would form the basis of this understanding. Unfortunately, with one exception, provincial administrative databases do not routinely collect information on the presence or concentration of alcohol in those who have been injured. Accordingly, practitioners must resort to other sources for information on the scope and nature of

the problem of injury associated with alcohol.

The most useful sources of provincial data are the surveys conducted by the Centre for Addition and Mental Health (CAMH), reported in the *CAMH Monitor: Addiction and Mental Health Indicators Among Ontario Adults, 1997-2005*, and *Drug Use Among Ontario Students 1977-2007*. (Adlaf, E.M. & Paglia-Boak, A., 2007) A useful summary of these and other sources can be found in "Alcohol, other drugs and related harms in Ontario: A scan of the environment." (Smythe, C., & Caverson, R., 2007) Finally, an exception to the absence of information on alcohol in provincial administrative datasets can be found in the Comprehensive Dataset of the Ontario Trauma Registry (Canadian Institute for Health Information, 2007) which contains a field for blood alcohol concentration (BAC) for all cases of serious trauma (admitted to one of the province's 11 Lead Trauma Hospitals). Unfortunately, this field is not routinely collected within the hospitals for all cases, and is in any case, not a population-based indicator.

Notwithstanding the above limitations, an examination of the data available indi-

cates that the use of alcohol is a prevalent and under-appreciated injury risk within the province of Ontario.

Risk Factors

Risk factors are those variables which increase the chance of a particular event of occurring. For injury, risk factors can often be grouped into those that are biological or intrinsic (such as age or gender), those related to behaviour (such as risk taking, or non-use of recommended protective measures), and those related to social and environmental factors (such as economic status, approval seeking among peers, the built environment, and the policy or regulatory regime).

For the purposes of this document, one can think of risk factors in two different ways:

- ❖ Alcohol and other drugs as a risk factor for injury
- ❖ Role of alcohol policy and social environment

Although alcohol is a risk factor in injury, high risk drinkers or drug users are not the only ones who are at risk of injury. Casual drinkers, who occasionally engage in the high risk practices of abusing alcohol or drugs, are also at risk of injury. Second, the impact of alcohol and other drugs is not only on personal injury risk,

but also increases the risk that one will do harm to another, either intentionally or unintentionally. Risks may also vary by age, gender, economic status, the presence or absence of other conditions (e.g., mental health issues) etc.

Alcohol and Other Drugs as a Risk Factor in Injury

Alcohol is an established risk factor for self-injury, violence, impaired driving, and unintentional injury.

Self-Injury

Self-injury for the purpose of this report is defined as any injury deliberately inflicted by a person upon their own body, with or without suicidal intention. (Hawton, K., Simkin, S., & Fagg, J. , 1997) It thus encompasses traditional notions of self-harm, as well as suicidal behaviour whether completed or not.

Research indicates that there is a greater relative risk for intentional injuries, particularly those injuries which are self-inflicted, when under the influence of drugs and/or alcohol. (Borges, G., et al., 2003)

A study conducted in an emergency department in Mexico City found greater relative risks for intentional injuries when

under the influence of drugs and/ or alcohol, especially those that were self-inflicted. (Borges, G., et al., 2003) The United States Centers for Disease Control and Prevention estimated that 28% of American suicides could be attributed to alcohol consumption. (WHO, 2002) An Australian review of alcohol-related disorders found that alcohol was implicated in 12% of male suicides and 8% of female suicides. (WHO, 2002) Three Canadian provincial coroners reported a considerably greater proportion of suicides attributable to alcohol. (WHO, 2002)

Recent studies report higher rates of self injury in adolescents and young adults; in both the United States and Canada, 14 to 15% of adolescents report at least one instance of self-injury. (Klonsky, E.D., & Muehlenkamp, J.J. , 2007) Recent studies have shown that alcohol and drug misuse are important factors in suicide by young people, especially males. (Klonsky, E.D., & Muehlenkamp, J.J. , 2007) A study of self-reported adolescent injury from falls found that 8.2% resulting in medical care occurred under the influence of alcohol or other drugs. (Spirito, A., et a., 1997)

This finding is consistent with the finding from a toxicological investigation of fatal

falls from buildings in New York City. A high incidence of drug use in suicide attempts was documented, with the finding that 36% of unintentional deaths due to falls from heights were associated with use of alcohol or illicit substances.

(Pressley, J.C. & Barlow, B. , 2005) Alcohol misuse is also common in attempted suicide patients and a considerable portion of self-injures have a history of substance abuse. (Klonsky, E.D., & Muehlenkamp, J.J., 2007)

Adolescents and young adults have higher rates of self-harm, especially completed suicide, which is more predominant in male youth in both the United States and Canada. Alcohol and drug use are important contributing risk factors in a large proportion of these cases. (Klonsky, E.D., & Muehlenkamp, J.J., 2007), (WHO, 2002) & (Hawton, K., Simkin, S., & Fagg, J., 1997) A history of substance abuse, including addiction, has also been identified as a risk factor for high risk alcohol use leading to self injury. (Hawton, K., Simkin, S., & Fagg, J., 1997)

Violence

Alcohol and drugs have both been studied for their role in increasing the risk of intentional injury from various types of interpersonal violence. While it is clear that alcohol has a role in many types of injury, the probability of acquiring different types of injuries are not the same across all groups. Borges et al. compared alcohol involvement in four different injury groups (falls, traffic crashes, assaults/fights, and home injuries) and found that injuries from assaults or fights were significantly more likely to involve alcohol than were any other types of injury. (Borges, G., et al., 2003)

Drugs and alcohol have been found in the systems of both those who have perpetrated the violent act, as well as those on the receiving end of the violence. For example:

- ❖ Overall, alcohol consumption has been determined to play a role in approximately 40% to 56% of assaults. (Borges, G., et al., 2003)
- ❖ Blood and urine samples of injured family members show a strong association between interpersonal violence and levels of alcohol and drugs.

(Madan, A., Beech, D.J. & Flint, L. , 2001)

- ❖ For some, particularly where there has been a noted predisposition to violence, drinking alcohol may serve as a trigger for violent behaviour. (Cook, P.J., 2007)
- ❖ Injuries from assaults or fights were significantly more likely to involve alcohol than any other types of injury. (Macdonald, S., et al., 1999)
- ❖ Cherpitel found that throughout the literature, individuals who test positive for alcohol are significantly more likely to report drinking prior to a violent event, than those sustaining injuries from other causes.(Cherpitel, C.J. , 2007)

Impaired Driving

Both legal and illegal substances have been heavily documented as having adverse affects for drivers, although the most substantive body of research pertains to alcohol use: (Smythe, C., & Caverson, R., 2008)

- ❖ Drivers and motorcyclists with any level of BAC greater than zero are at a higher risk of a crash than those with

Table 2 - **Physiological Impairments to Driving Resulting from Alcohol**

Use (NHTSA Review)

Divided Attention:	Majority of the studies found that individuals could best divide their attention at or below BACs of 0.08mg/ml; however, some studies reported that impairments of divided attention began at BACs of 0.05mg/ml. This is especially significant as driving a motor vehicle requires multi-tasking, and a BAC above these levels would seriously hinder this ability.
Tracking Performance:	This relates to control over the path of the vehicle. The studies reviewed found an onset of impairment at 0.05mg/ml for tasks such as staying between the lanes. When tracking the vehicle compared to other moving objects, the onset of impairment was found to be even lower.
Information Processing:	This skill becomes impaired at a BAC of 0.08 mg/ml; however, only a few of the studies examined concentrations of 0.05mg/ml or lower.
Psychomotor Skills:	Skilled psychomotor tasks often become impaired at 0.05 BAC, while psychomotor tasks requiring less skill become impaired at higher levels.
Visual Functions:	Control of eye movement tends to become impaired at alcohol concentration levels of 0.05mg/ml or less.
Reaction Time:	Most studies find that complex reaction times (requiring precise decision making) can become impaired at BAC levels of 0.03mg/ml-0.04mg/ml. Simple reaction times, where accuracy is less important, become impaired at 0.04mg/ml or more.
Perception:	Most studies find little impairment of perception below a BAC of 0.08mg/ml.

a BAC of zero. Thus, any BAC greater than zero is a risk of a crash.

- ❖ For the general driving population, as the BAC increases from zero, the risk of being involved in a crash starts to rise significantly. In other words, as ones BAC increases (even below the legal limit) the risk of a crash increases directly.
- ❖ The higher the blood alcohol concentration (BAC), the higher the risk of being fatally injured in a motor vehi-

cle collision. Therefore, an elevated BAC not only increases ones risk of crashing, but also of dying in the event of a crash.

- ❖ Snowmobile and ATV crash deaths are of particular concern, because 16 to 25 year olds are significantly over-represented, and alcohol is involved the majority of the time.
- ❖ Alcohol use results in a range of physiological impairments to driving ability (see Table 2). These impair-

ments are usually visible below the legally restricted level of 0.08mg/ml, and increase with BAC. It should be noted, however, that most MVCs actually involve higher levels of BAC than these.

- ❖ Males are more likely to exhibit high impulsivity which is a risk factor for drinking and driving, as well as for binge drinking. (MADD Canada & CAMH, 2006)

Other Unintentional Injuries

Falls

Injury from falls is one of the few areas of unintentional injuries in which a substantial volume of research has been completed. (WHO, 2002) In 2000/2001, 27% of all people hospitalized due to a fall had blood alcohol concentrations over 0.08%. (Cook, P.J., 2007) Further details on alcohol as a risk for fall injuries can be found in the OIPRC report, *Falls Across the Lifespan*, for example:

- ❖ Substance use, particularly alcohol, is a risk factor for various falls among teens. (Ryb G.E., et al., 2006)

- ❖ Alcohol use remains a risk factor for falls in the age group 20-54. (Canadian Foundation for Drug Policy, 1993)

Sports and Recreation

Alcohol is a risk factor for other types of injury, as well. In a study testing the blood alcohol concentration of individuals who were hospitalized in Ontario for injuries sustained from participating in a sport or recreational activity in 1999 and 2000, 21% of those tested had a BAC above the legal limit. (Cook, P.J., 2007)

Additionally, alcohol was a factor in 40% of the 36 snowmobile deaths in the 2000/2001 season. (Macdonald, S., et al., 1999)

In a review of the literature on alcohol and drownings conducted by Smith and Brenner, it was estimated that 25% to 50% of all drownings involve alcohol. (WHO, 2002)

Fire

Finally, as many drinkers are also smokers, there has been some research on the involvement of alcohol in fire related deaths and injuries caused by cigarettes. (WHO, 2002) For example, an analysis of fatal fires in Ontario, revealed that alcohol was implicated in 42% of home fires started by cigarettes and by cooking, and

also in more than 40% of cases where occupants failed to escape a home fire. (Groff, 2005)

Psychological Risk Factors for High Risk Substance Use

Individuals may have pre-determinants of future violent behaviour, which include a variety of psychosocial and developmental factors, as well as a history of propensity to engage in violence. (Boles SMM, K. , 2003)

Other factors such as a risk-taking disposition (e.g., degree of risk perception and impulsivity) have been linked to substance abuse disorders, risky behaviours (e.g., binge drinking, drinking and driving, riding with a drunk driver, and low seatbelt usage), and injury. (Ryb, G.E., et al., 2006) Furthermore, peer reinforcement of antisocial or self-destructive behaviour was associated strongly with arrest, injury, and death. (Spirito, A., 1997)

These factors may increase the likelihood of a person engaging in alcohol and/or drug misuse as well as independently increase their risk for injury.

Role of Alcohol Policy and Social Environment

Several factors, including local and provincial policies in the social environment, increase the likelihood for an individual to engage in alcohol use: (Cook, P.J., 2007) & (Babor, T., et al., 2003)

- ❖ Increased affordability (lowering of price).
- ❖ Increased availability and accessibility to alcohol - increased hours of sale, number of outlets and location
- ❖ Real and perceived social norms that are contrary to low risk drinking guidelines.
- ❖ Increased prevalence of advertising and sophisticated marketing strategies aimed at vulnerable populations (e.g., youth).
- ❖ Normalization of drinking to the point where choosing to abstain, either for an event or a longer term, is considered abnormal and in need of justification.

Evidence-Informed Practice Recommendations

Evidence informed practices are interventions that have been cited by researchers or organizations who conducted systematic reviews of relevant literature, and from successful program interventions. For the purposes of this document, a systematic review was done using key descriptors. They included:

- ❖ Substance / drug use / abuse
- ❖ Alcohol use / abuse
- ❖ Injuries (intentional and unintentional) and substance use / abuse
- ❖ Violence and substance use / abuse
- ❖ Canadian substance / alcohol / drug policy

Using the above descriptors, a computerized search of the English-language literature on PsycINFO, Cochrane Database, Web of Science, and Medline, was carried out to identify practices and systematic reviews on injuries associated with alcohol and substance use. A search of bibliographic references of recent and relevant journal articles, literature re-

views, and reports was also conducted to ensure inclusion of all potentially suitable studies. All articles identified were reviewed and included only if they contained data that was relevant to the Canadian population and discussed injury as a result of alcohol or drug use.

Articles were sought to include research on the impact of all substances on injury risk. The scope was later narrowed to primarily focus on injuries associated with alcohol use at the advice of the review advisory committee, based upon the following: while all mood altering drugs pose a potential risk, alcohol is one of the most actively used drugs that contributes to injury. As a result, there is greater availability of research on evidence based practices,, primarily in the area of healthy public policy that could impact on preventing these alcohol-related injuries.

What Do We Know?

The link between high-risk alcohol use and an increase in the risk of injury has long been established by reputable, validated research; however, the evidence is not so clear on alcohol policy and the other forms of injury prevention programming used in the efforts to alleviate the injury burden associated with alcohol

use--with the exception of drinking and driving.

Currently, the fields of high-risk alcohol use prevention and injury prevention have not been working together as complementary entities though the link has been made between them showing alcohol as a risk factor for injury. It is therefore essential for public health officials, researchers, injury prevention specialists, and others to work together towards forging the link between alcohol policy and the traditional injury prevention field to reduce and minimize the risk of harm related to alcohol and injury. It is important that this link be promoted, as in this way it is more likely to get into the public and political mindsets as well as into the minds of professional practitioners.

What has been demonstrated, time and again, by those researching effective alcohol prevention is that it is necessary to take a comprehensive approach to this issue, which includes education and awareness, policy and legislation, enforcement and penalties, and modifications to products and the environment. Such a comprehensive approach could resonate with those working on injury

prevention from a population health perspective.

Once the most effective interventions have been established, it is time to allocate all necessary financial and human resources. The risk reduction of injury from alcohol and drug use requires strategic and focused planning and implementation of limited resources, using available evidence and innovative approaches.

While lessons can be learned from the successful impact of drinking and driving programs and policies, it is clear that long-term sustainable commitment is needed, along with research resources to evaluate program interventions. It is also important to stop doing what we know does not work, such as one-shot, stand-alone education efforts. Simply saying, for example, "do not drink and snowmobile," will not work, and is a waste of valuable resources.

Components of a Comprehensive Approach

Putting Alcohol Priorities on the Agenda

Influence Federal and Provincial alcohol priorities:

- ❖ Advocate for alcohol policies that impact on population health. In the early stages when policies are being discussed on the commercial agenda concerning alcohol distribution and promotion, public health could find a way to get to the table to discuss alcohol-related damage.
- ❖ Collaborate with other stakeholders who have impacted on policy changes with alcohol and other substances. For example, tobacco control experiences may offer lessons to learn from or opportunities for creating similar linkages.
- ❖ Seek alliances at the national and international level to further the exchange of research and promising practices and engage senior levels of government in policy change.
- ❖ Develop advocacy opportunities by collaborating with alcohol policy monitoring and alcohol/drug/injury strategy groups federally and provincially to network with practitioners, NGOs and researchers.
- ❖ Advocate for a national injury strategy that includes the role of alcohol.
- ❖ Collaborate with researchers and other experts in this field so that findings are presented to policy makers through briefing notes, summaries, seminars and workshops.
- ❖ Engage evaluation experts (e.g., CAMH, OIPRC, THCU) to monitor and report attitudes, practices and impact by regular surveys on alcohol issues and alcohol and injury behaviours.
- ❖ Collaborate with key stakeholders (e.g., Canadian Centre on Substance Abuse) to support efforts to address policy issues that are based on a four pillar approach, evidence and that cross the sectors.
- ❖ Review alcohol advertising research to determine the impact on youth, and inform policy makers about alcohol influences on youth.

- ❖ Advocate for the creation of a more level playing field for health promotion messages competing for the attention of vulnerable audiences with alcohol advertising by addressing level and quality of alcohol advertising and CRTC guidelines.
- ❖ Educate safety and injury prevention experts on the role of alcohol as a major risk factor that impacts on the increased risk of injury.
- ❖ Advocate for additional resources for research on alcohol and effective prevention initiatives.

Policy and Enforcement Initiatives

Public Health could align to advocate with others for the public policy alcohol priorities for Ontario: The following is a sample of best public policies.

Support the use of alcohol taxes for addressing alcohol consumption:

- ❖ It is recommended that pricing within the various beverage categories reflect the alcohol content of the specific products (e.g., proportional taxing). Public health practitioners can help by informing their local boards of health and their MOH.
- Support the regulation of alcohol availability.*
- ❖ Work with partners and through committees and public education to inform others and counteract the erosion of government monopoly of retail sales (to avoid privatization).
 - ❖ Support outlet density restrictions. These would limit the availability of alcohol to the public by implementing measures to control the spacing of retail outlets, especially in local neighbourhoods and larger entertainment areas (e.g., could inform local city council, police and AGCO Liquor Inspectors on validity of doing so).
 - ❖ Support efforts to maintain minimum alcohol purchasing ages. Encourage more rigorous local enforcement of the current liquor licence restrictions for selling, serving and giving alcohol to minors.
 - ❖ Support efforts to restrict hours and days of sale and limit the availability of alcohol to the public through local measures controlling the time of sales.

- ❖ Promote local alcohol free events, for example, safe-grad events, municipal celebrations for New Year’s Eve that don’t involve sale or consumption of alcohol.

Develop, support and promote interventions that modify the drinking environment through:

- ❖ Server training, bar policies and alcohol regulation
- ❖ Support enforcement of alcohol service policies and clear penalties for violators.
- ❖ Collaborate with community partners to monitor alcohol related violence and other injury related issues.
- ❖ Encourage use of the Safer Bars program.
- ❖ Work with municipal governments and others to establish a municipal alcohol policy based on guidelines supported by the Ontario Recreational Facilities Association.

Develop, support and promote interventions that support drinking and driving counter-measures:

- ❖ Inform and advocate with your local board of health and MOH for the need to support efforts to lower legal limits for blood alcohol concentrations for all drivers, and promote the need to enact a standardized zero BAC limit for all drivers under the age of 21 years.
- ❖ Work with police and media to support local enhanced sobriety check points and remind the public about the value of these checkpoints.
- ❖ Work with police and media to educate the public about administrative license suspensions, and the legal, financial, and social costs of a suspension.

Education and Awareness

Research has found that targeted social marketing within a comprehensive approach of educational and policy initiatives is an effective way to impact on positive attitudes in the public with respect to alcohol use, but may not necessarily lead to behaviour change. A social and policy environment which supports the messages from these campaigns is instrumental in effectively motivating the public to sustain long term behaviour

changes, such as adopting low-risk drinking behaviours. Policy change at the local and/or provincial level will likely be needed in order to maximize the effectiveness and sustainability of social marketing, such as restrictions with respect to counterintuitive advertisements. Several provinces no longer allow airing of television and radio advertisements for alcohol. Other provinces have banned print-media advertisements. In Manitoba and Ontario, the restrictions are less severe. Public health may have a role to not only use social marketing techniques to educate the public about high-risk drinking practices that lead to injury, but also to influence legislation regulating the advertising that appears in the province. (Babor, et. al. 2003)

Develop, support and promote interventions using best practices in social marketing techniques which include:

- ❖ Being part of a comprehensive approach that includes education/awareness, policy, enforcement, and penalties, (as well as potential engineering changes).
- ❖ An analysis of the social and policy context.

- ❖ Maximizing the attractiveness of the ideal behaviour to the target audience and highlighting the flaws in messages which try to make negative behaviour appealing.
- ❖ Using credible sources to communicate positive messages (it is important to exercise caution about who is being used to convey what message.)
- ❖ Using more than one type of media when communicating messages.
- ❖ Aiming to influence those who are in a position to educate or promote messages to the public.
- ❖ Eliminating negative messaging.
- ❖ Generating positive drug and alcohol behaviour (e.g., compliance with low risk drinking guidelines, safe medication use) using the media.
- ❖ Promoting messages using wording which will generate interest for individuals of all ages, gender, and ethnicities.
- ❖ Working in partnership with other key stakeholders, including researchers, policy makers, NGO sector, media, and others.

Plan social marketing campaigns to:

- ❖ Promote low risk drinking guidelines.
- ❖ Generate knowledge about the risks associated with alcohol and drug misuse. Involve the local public in addition to NGOs, local government, and other activists in the community.
- ❖ Increase awareness of the injuries associated with drug and alcohol misuse by working with government departments and agencies (LCBO and NGOs). With the awareness of the strong potential injury risk, effective interventions can be implemented.

Reorientation of Services

Be part of local coalitions and collaborate with key stakeholders to plan interventions that offer treatment and early intervention services:

- ❖ Encourage practitioners to adopt a population health approach to treatment for alcohol-related problems.
- ❖ Re-orient services so there is an allocation of resources that reflect priorities for treatment and prevention efforts.
- ❖ Support those working within the health care system as they plan brief interventions for hazardous drinkers

during routine clinical visits, intended to provide early intervention with a goal of reducing alcohol consumption to a moderate level (e.g, by providing information).

Conclusion

By successfully promoting and instituting the suggested interventions in partnership with key stakeholders and promoting the development of public policies supported by prevention programming initiatives, it is possible that a decrease in the rate of injury associated with drug and alcohol use could be achieved.

A comprehensive approach, involving education and awareness, policy development, policy enforcement and penalties is the key. Alcohol strategies need to be based on the four pillars approach which consist of health promotion, treatment, enforcement, and harm reduction. These pillars cut across the sectors both in and out of health (e.g., police, media, schools, addictions, etc.) Public health has a key role to play, in partnership with each of these sectors, in developing and supporting a successful, strategic, comprehensive approach to alcohol use, and the injuries that result from it.

Implementation and Evaluation

Resources, further research and attention is needed to determine the unique risk factors, numbers, and rates of injury associated with the use of alcohol and other substances. This will help tailor multifaceted injury prevention strategies to be developed and implemented.

Implementation and ongoing evaluation at each stage is essential in order to maximize the effectiveness of reducing the risk of injury associated with alcohol and substance use. Because alcohol and substance use and the injuries associated with it affect the community as a whole, multiple levels of the local community need to be involved in order to gain maximum benefit from injury prevention programs.

Complementary and tailored interventions also need to be targeted globally and nationally as the social, economic and health impact of drug and alcohol use affects these levels, in addition to local levels (Giesbrecht, N., & Haydon, E. 2006).

Evaluation of Prevention Initiatives

Determining the effectiveness and efficacy of an injury prevention program is an important step prior to its implementation. To do this, an evaluation framework needs to be put in place, which looks at not only the intended outcomes of the program and initiatives, but also evaluates each stage of the implementation process. As a first step, research support is needed to collect local baseline data.

Research indicates that evaluation is not a consistent, standard practice for local initiatives. Therefore, effective evaluation needs to become a routine and standardized practice when implementing injury prevention initiatives, particularly at a local level. This will require partnerships with researchers, as well as those with expertise in evaluation (e.g., OIPRC, THCU, CAMH).

Any evidence-based population health approach to injury prevention requires resources within the community (Nova Scotia Injury Prevention Strategy, Nova Scotia Health Promotion, 2003). This type of approach to injury prevention incorporates the whole population and works on

improving the health of the population over its life-course. It focuses not only on the physical health of the individual, but also the social, political, and economic conditions and how they affect health on a broader population base.

The effectiveness of a program is measured by the ability of the program to reduce or minimize the risk of injury in a given population. In addition to assessing the effectiveness of a program, it is also important to determine the efficiency of a program, or in other words, the ability of the program to produce the greatest outcomes using the smallest amount of resources, as often resources are limited (The Injury Prevention and Evaluation Cycle, British Columbia Injury Research & Prevention Unit).

There are numerous factors to consider when evaluating a program. For example, questions to consider include:

- ❖ Does local data for a baseline exist? If not, how will it be collected?
- ❖ What was identified as the issue to be addressed? Which risk factors were targeted?
- ❖ Has anyone else addressed this issue successfully before? If so, what did they do, and how can it be translated to our local context?
- ❖ What goals do we hope to achieve, and how can they be translated into specific, measurable objectives? How can these be expressed as intended short-term and long-term outcomes?
- ❖ Who do we need to align or partner with to achieve our intended outcomes?
- ❖ Who are we targeting with our messages or other interventions?
- ❖ Is each step of the process that was decided upon complete?
- ❖ Are the appropriate age groups (target population) being reached?
- ❖ Are we having an impact on our intended short-term outcomes (e.g., Are the skills being taught? Are changes in attitude, knowledge, and behaviour around risk being realized?)
- ❖ Are we having an impact on our intended long-term outcomes (e.g., Is there a reduction in high-risk alcohol and substance use and the injuries associated with it?)

When looking at the efficiency of the program, the cost effectiveness of the initiative is an important aspect to consider. For instance, seniors, a population which has been established as one at risk for substance use and therefore at risk of sustaining injuries as a result, use health care resources for often lengthy periods of time. By reducing the occurrence of high-risk substance use and injuries associated with it among this age group, one would not only improve their quality of life, but would also produce cost savings in health care resources.

Implementation of evidence informed practice recommendations

Once the various factors associated with an injury prevention program have been considered, modified, and adapted to meet the needs of the at-risk population and the program itself has been established as one considered optimally effective in reducing the burden of injury, the planning and implementation process can effectively begin. A sample of such a process, using the five-step public health approach, is summarized in Figure 1. Note that the process begins with defining the problem, moving on to identify-

ing risk and protective factors, selecting an intervention, implementing and evaluating the intervention. While the process is shown proceeding in a single direction, it is important to note that it may be necessary to revisit an earlier stage of the process at any time, as new information and a richer understanding of the injury issue, and the social and political context comes to light.

When implementing a plan, a specific system must be in place to guide the prevention initiatives. This includes specific goals, objectives, timelines, personnel responsible, costs, evaluation protocols, and room for potential modification. Such a system involves asking questions at each stage of the process, which in turn link to evaluation issues. For example, defining the problem amounts to asking, “Who is getting hurt and how?” In evaluation terms, answering this question corresponds to conducting a needs assessment. Defining the problem concludes when one has a clear goal, or statement of intended change in mind.

Once one has a goal or goals defined, one can translate these into objectives using the old anagram SMART, a mnemonic device to remind one that objectives are

to be: specific, measurable, attainable, relevant, and time-bound. In short, they are specific statements of what one wants to see change as a result of the intervention, for whom, by how much, and over what timeframe. The link back to evaluation is again clear, as in evaluation terms objectives are really just intended outcomes.

Once one has intended outcomes, one can continue the plan by identifying: which activities will produce these outcomes; who needs to be targeted by these activities, and how these activities naturally group into the components of your intervention. One can diagram the connections between components, activities, targets, short-term outcomes, and long-term outcomes to produce a program logic model that will help guide implementation, evaluation, and communication with program stakeholders, management, and staff.²

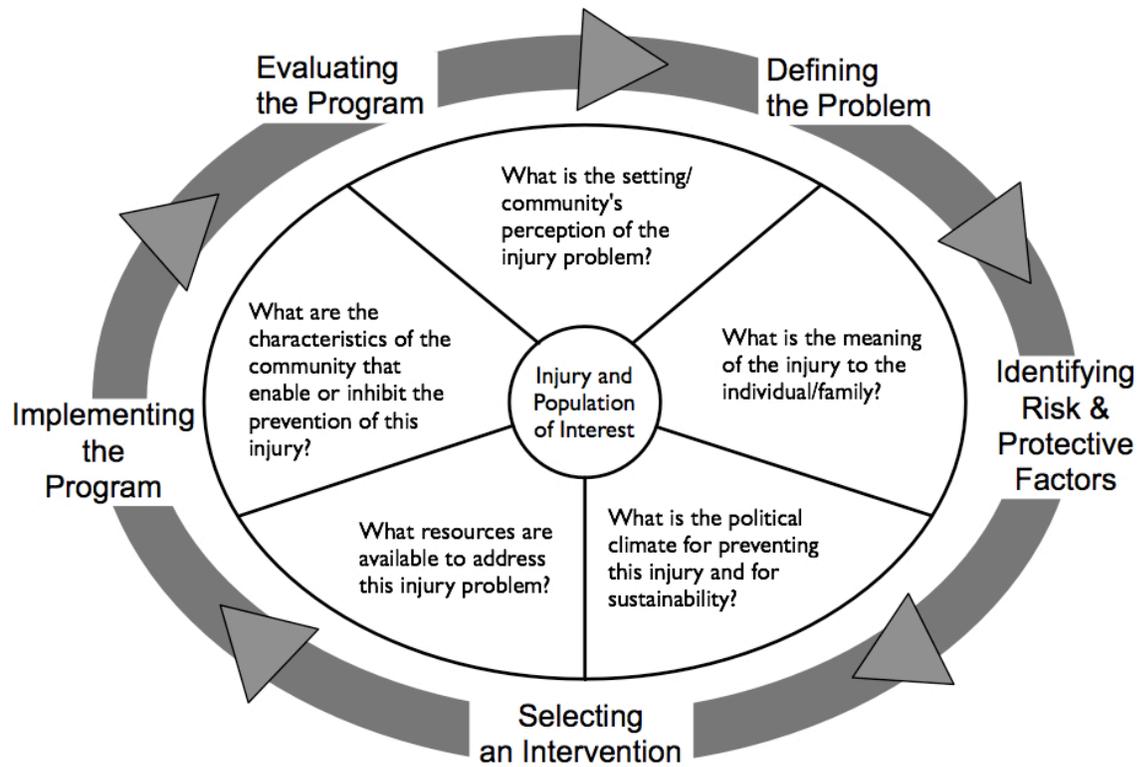
Programs are most effective when an individual is assigned to manage the specific tasks in the plan. Without this, the goals of the program may not be reached. As an important first step of any plan which involves communication, it is essential to consider the target audience

with respect to their attitudes and beliefs about substance misuse and injury risk. By doing this, the program can be carried out in a way which will increase the likelihood of change in knowledge and skills of that population, in particular (The Injury Prevention and Evaluation Cycle, British Columbia Injury Research & Prevention Unit).

It is also important to tailor the intervention to the local social and political context, as only then can the injury prevention strategies become maximally effective in modifying the knowledge and skills, and subsequently reducing the risk and prevalence of injury. Figure 1 centers the program planning and implementation process on the social and policy context for this very reason.

For example, the appropriate and necessary social and political support must be available in the local community in order to successfully implement the program. Without support at these levels, the implementation process can be slowed or hindered. Connect and collaborate with individuals in your community including city council, substance abuse coalitions, public health organizations including those that address addictions issues, po-

Figure 1 - **Planning and Implementing an Injury Prevention Intervention and its Relationship to the Social and Policy Context** (Canadian Collaborating Centres for Injury Prevention, 2008)



lice, health care professionals and other key stakeholders. Seek out community and business groups which will support programs of this type.

At this stage, potential limitations must also be considered. This includes issues related to the availability of resources in the community. This will differ in each community and must be adapted to accordingly.

And finally, as with any injury prevention plan, continuous refinement and modification will occur as the plan is further developed. As injury priority issues change, so will the programs put in place. This further emphasizes the importance of continuous evaluation at all stages of implementation by way of surveillance, research, and consultation.

References

- Adlaf, E.M., Demers, A. & Gliksman, L. (Eds.). (2005). *Canadian Campus Survey 2004*. Toronto: Centre for Addiction and Mental Health.
- Adlaf, E.M., Ialomiteanu, A. & Rehm, J. (2008). *CAMH Monitor eReport: Addiction & Mental Health Indicators Among Ontario Adults, 1977-2005 (CAMH Research Document Series No. 24)*. Toronto: Centre for Addiction & Mental Health.
- Adlaf, E.M. & Paglia-Boak, A. (2007). *Drug Use Among Ontario Students 1977-2007. (CAMH Research Document Series No. 20)* Toronto: Centre for Addiction and Mental Health.
- Babor, T., Caetano, R., Casswell, S., et al. (2003). *Alcohol: No Ordinary Commodity research and public policy*. Oxford: Oxford University Press.
- Boles SMM, K. (2003). Substance Abuse and Violence: A Review of the Literature. *Aggression and Violent Behaviour*, 8, 20.
- Borges, G., Cherpitel, C. J., Mondragon, L., Poznyak, V. & Gutierrez, I. (2003). Episodic Alcohol Use and Risk of Nonfatal Injury. *American Journal of Epidemiology*, 159.
- Canadian Collaborating Centres for Injury Prevention. (2008). *Canadian Injury Prevention Curriculum, 2nd Edition*. Toronto: Canadian Collaborating Centres for Injury Prevention.
- Canadian Foundation for Drug Policy. (1998). *Drugs and Drug Policy in Canada: A Brief Review & Commentary*. Retrieved from <http://www.cfdp.ca/sen1841.htm>.
- Canadian Institute for Health Information. (2007). *Ontario Trauma Registry Report: Major Injury in Ontario, 2005-2006 and 2006-2007*. Toronto: Canadian Institute for Health Information.
- Centre for Addictions and Mental Health. (2008). *Low - Risk Drinking Guidelines: Maximize Life, Minimize Risk*, Retrieved April 2008 from [http://www.camh.net/About Addiction Mental Health/Drug and Addiction Information/low risk drinking guidelines.html](http://www.camh.net/About_Addiction_Mental_Health/Drug_and_Addiction_Information/low_risk_drinking_guidelines.html)
- Chamberlain, E., & Solomon, R. (2006). *Youth and Impaired Driving in Canada: Opportunities For Progress*. London: MADD Canada.
- Cherpitel, C.J. (2007). Alcohol and Injuries: A Review of International Emergency Room Studies Since 1995. *Drug and Alcohol Review*, 26,13.
- CIHI, (2004/2005). *Ontario Trauma Registry*. Retrieved November 2008 from http://www.cihi.ca/cihiweb/dispPage.jsp?cw_page=services_otr_e.
- Cook, P.J. (2007). *Paying the Tab: The Economics of Alcohol Policy*. Princeton: Princeton University Press.

- Council on Drug Abuse (2008A). The Drug File: OTC Drug Abuse, Dextromethorphan. Retrieved October 2008 from http://drugabuse.ca/newsletter_pdfs_v01_i02/03_The_Drug_File_Dextromethorphan.pdf
- Council on Drug Abuse (2008B). How Safe are Safe Drugs. Retrieved October 2008 from http://drugabuse.ca/02_HOW_SAFE_ARE_SAFE_DRUGS.pdf
- Groff, P.R. (2005). Fatal fire scenarios in Ontario. Paper presented at the Ontario Injury Prevention Conference, March 22, 2005.
- Hawton, K., Simkin, S., & Fagg, J. (1997). Deliberate Self-Harm in Alcohol and Drug Misusers: Patient Characteristics and Patterns of Clinical Care. *Drug and Alcohol Review*, 16, 123-9.
- Klonsky, E.D., & Muehlenkamp, J.J. (2007). Self-Injury: A Research Review for the Practitioner. *Journal of Clinical Psychology: In Session*, 63,1045-56.
- Macdonald, S., Wells, S., Giesbrecht, N. & Cherpitel, C.J. (1999). Demographic and substance use factors related to violent and accidental injuries: results from an emergency room study. *Drug and Alcohol Dependence*, 55(1-2), 53-61.
- Madan, A., Beech, D.J. & Flint, L. (2001). Drugs, Guns, and Kids: The Association Between Substance Use and Injury Caused by Interpersonal Violence. *Journal of Pediatric Surgery*, 36, 3.
- MADD Canada & CAMH. (2006). *Alcohol, Trauma and Impaired Driving, 3rd Edition*. Toronto: MADD Canada Centre for Addiction and Mental Health.
- Ministry of Health, Technical Review Committee. (2007). *Ontario Public Health Standards*. Retrieved April 2008 from http://www.health.gov.on.ca/english/providers/program/pubhealth/manprog/ophs_20080407.pdf.
- Neutel, C.I., Hirdes, J.P., Maxwell, C.J., & Patten, S.B. (1996). New Evidence of Benzodiazepine Use and Falls: The Time Factor. *Age and Ageing*, 25.
- Pressley, J.C. & Barlow, B. (2005). Child and Adolescent Injury as a Result of Falls From Buildings and Structures. *Injury Prevention*, 11.
- Rehm J., Ballunas, D., Brochu, S., Fletcher, B., Gnam, W., Patra, J., Popova, S., Sarnoclnska-Hart, A. & Taylor, B. (2006). *The Costs of Substance Abuse in Canada 2002*. Ottawa: Canadian Centre on Substance Abuse.

- Ryb, G.E., Dischinger, P.C., Kufera, J.A., & Read, K.M. (2006). Risk Perception and Impulsivity: Association with Risky Behaviors and Substance Abuse Disorders. *Accident Analysis and Prevention*, 38.
- Sawaka, E., et al., (2007). *Reducing Alcohol-Related Harm in Canada: Toward a Culture of Moderation, Synopsis of a Proposed National Alcohol Strategy*. Retrieved November 2008 from [www.ndphs.org/?download,964,Canada Paper NAS to Riga Conference Jan 30 07 1.pdf](http://www.ndphs.org/?download,964,Canada%20Paper%20NAS%20to%20Riga%20Conference%20Jan%2030%2007%201.pdf).
- SMARTRISK. (2006). *The Economic Burden of Injury in Ontario*. Toronto: SMARTRISK.
- Smythe, C., & Caverson, R. (2007). *Alcohol, Other Drugs, & Related Harms in Ontario: A Scan of the Environment*. Toronto: Centre for Addiction and Mental Health.
- Smythe, C., & Caverson, R. (2008). *Alcohol, Other Drugs, & Related Harms in Ontario: A Scan of the Environment*. Toronto: Ontario's Health, Education and Enforcement in Partnership (HEP).
- Spirito, A., Rasile, D., Vinnick, L.A., Jellian, E. & Arrigan, M. E. (1997). Relationship Between Substance Use and Self-Reported Injuries Among Adolescents. *Journal of Adolescent Health*, 21.
- WHO. (2002). *International Guide for Monitoring Alcohol Consumption and Related Harm; 2000*. WHO.
- Xie, X., Rehm, J., Single, E., Robson, L. & Paul, J. (1998). The Economic Costs of Illicit Drug Use in Ontario, 1992, *Health Economics*, 7.