ALCOHOL & YOUR HEALTH

SoberSmartDriving.tirf.ca

The Sober Smart Driving education program is produced by the **Traffic Injury Research Foundation** with funding from **Beer Canada**. It shares knowledge and science to answer common questions about alcohol, its effects on driving skills, and impaired driving.

What is responsible drinking?

In order to drink responsibly, an individual should plan ahead and consume alcohol in moderation. According to a variety of health agencies, consumption guidelines generally recommend no more than one drink per day for women (or no more than nine drinks per week) and one to two drinks per day for men (up to 14 drinks per week) (Canadian Public Health Association, 2010). It should be noted responsible drinking does not mean abstaining from alcohol.

To develop a culture of moderation concerning alcohol consumption, the Canadian National Alcohol Strategy Working Group (2007) identified the need for a shift in public attitudes and thinking to develop a "culture of moderation" which includes "understanding when, when not, and how much to drink, appropriate motivations for drinking, and settings in which responsible drinking should take place".

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In other words, individuals are encouraged to drink sensibly and avoid situations in which decision-making is impaired and they are likely to sustain injuries or experience harm, for example as a result of impaired driving. Responsible drinking is the opposite of excessive alcohol consumption or binge drinking.

What is binge drinking?

Binge drinking has been defined differently by different stakeholders. Most often, the definition highlights the consumption of large amounts of alcohol within a short period with the primary goal of becoming intoxicated or very intoxicated. In other words, binge drinking is a single occasion of drinking heavily. According to the Canadian Medical Association, a binge drinking episode consists of five or more standard drinks for men and four or more standard drinks for women on a single occasion. Binge drinking can overlap with social drinking and is a growing concern among youth, particularly college and university students. In this regard, a standard drink is considered to be one 355 ml bottle of beer, one 150 ml glass of wine or approximately 40 ml of distilled spirits (e.g., rum, vodka, whisky). It is important to note the amount of alcohol in each of these types of drinks is more or less equivalent, so the impairing effects are more or less the same.

What are the risks associated with binge drinking?

Binge drinking can lead to many negative consequences with potentially serious or life-long effects and possible death. Some of the risks associated with excessive alcohol consumption include:

- **Alcohol poisoning.** Alcohol depresses the nervous system which is responsible for controlling involuntary bodily functions such as breathing. The nervous system also controls the gag reflex which prevents choking. Large doses of alcohol can interfere with, or prevent, these functions. Since alcohol irritates the stomach, consuming too many drinks can cause vomiting (Canadian Public Health Association, 2010). If the gag reflex is not working, it can make it difficult to breathe. Other symptoms of alcohol poisoning include unconsciousness, confusion, seizures, slow and/or irregular breathing, and pale/bluish skin (Centre for Addiction and Mental Health, 2010).
- **Impaired judgment.** The consumption of large amounts of alcohol can impair decision-making and lead to risky choices (Canadian Public Health Association, 2010). Impaired judgment can result in individuals taking risks they would otherwise avoid if they were sober (e.g., having unprotected sex which increases the risk of sexually transmitted diseases). It can also lead to engaging in reckless behaviour which could foreseeably result in injury such as driving under the influence (Zeigler et al., 2005).
- **Mental health.** Binge drinkers have a harder time focusing on tasks daily and for this reason, they are less likely to succeed in school or maintain employment (Zeigler et al., 2005). Excessive and prolonged drinking can disrupt sleep patterns which affect an individual's ability to concentrate (NIAAA, 1998). It can also produce mood changes or mood swings, brain damage, and memory loss.
- **Alcohol dependence.** Individuals who engage in binge drinking frequently (three or more episodes in two-weeks) may be classified as alcohol abusers and begin to exhibit some of the symptoms associated with alcohol abuse (NIAAA, 2007). These symptoms include stomach ulcers, sexual problems (i.e., impotency and infertility), cirrhosis of the liver, heart disease, nutritional deficiencies, and alcohol-induced dementia.

How does alcohol consumption affect youth?

Young people are vulnerable to alcohol-induced brain damage, which could contribute to memory loss and poor performance in the classroom (and later in the workforce) as well as behavioural problems. Adolescence is the transition period between childhood and adulthood. During this time, significant changes occur in the body including the formation of new networks in the brain. Frontal lobe development and the refinement of neural pathways and connections continue until during teenage

years and into the early 20s (Begley, 2000). Damage from alcohol at this time can be long-term and irreversible affecting both memory and behaviour control (White, 2001; Brown et al., 2001). By exposing the brain to alcohol during this period, key processes of brain development may be interrupted which can cause damage.

Medical findings confirm this danger: the hippocampus, the part of the brain that is the centre for learning and memory, is smaller in adolescents who are alcohol-dependent (Nagel et al., 2005). These youth may never be able to catch up to their peers in adulthood because they will have learning difficulties, memory loss, and trouble maintaining employment and relationships.

The problem of youth drinking is cause for concern. According to Statistics Canada and the 2018 Canadian Community Health Survey, between 3% to 5% of Canadian youth aged 12 to 17 have consumed alcohol at a rate of five or more drinks per week, a number which has been consistent since 2015. Further, 5.6% of Canadian youth aged 12 to 17 reported consuming an alcoholic beverage in the previous 12 months. Among those who did drink, 37.8% of them did so at least once a month. This is despite the fact it is illegal to sell alcohol to persons under the age of 19 in Canada (18 in Quebec) (survey source: https://www150.statcan.gc.ca/n1/pub/82-625-x/2019001/article/00007-eng.htm).

Similar numbers exist in the US according to the National Institute for Alcohol Abuse and Alcoholism. They report that by age 15, about 29% of teens have had at least one drink and by age 18, this number increases to 58%. They estimate that, in 2018, 7.1 million young people ages 12-20 drank alcohol beyond "just a few sips", despite the legal drinking age being 21 in most states. Further, they also report 4.3 million youth binge drinking at least once a month (survey source: https://www.niaaa.nih.gov/publications/brochures-and-fact-sheets/underage-drinking).

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Statistics such as these are disturbing given the earlier the age of onset alcohol consumption, the greater the likelihood usage may develop into addiction later in life. Youth who begin drinking at a younger age are more likely to drink heavily frequently and experience alcohol-related harm (National Alcohol Strategy Working Group, 2007), as well as drink and drive. People who begin drinking before age 15 are four times more likely to develop alcohol dependence at some time in their lives compared to those who have their first drink at age 20 or older.

The negative consequences associated with underage drinking are numerous:

- poor academic performance;
- behavioural problems;
- involvement in dangerous situations (e.g., high-risk sex, impaired driving, violent altercations);
- decreased cognitive flexibility;
- decreased psychomotor speed;
- impaired response inhibition;
- increased risk of alcohol dependency;
- increased risk of depression;
- increased risk of suicidal thoughts; and,
- involvement with the criminal justice system.

Given the serious nature of these consequences, sharing information with adolescents about the dangers of alcohol is quite important.

Is there a relationship between alcohol consumption and depression?

There is evidence linking alcohol consumption to depression (Davidson and Ritson, 1993; Gorwood, 1999). Alcohol consumption and depression often occur in combination and can have a cyclical relationship where one enhances the other. Research has shown alcohol dependence and major depressive episodes occur together, typically within short periods (Kessler et al., 1996; Kessler et al., 1997; Lynskey, 1998). The more alcohol consumed, the more symptoms of depression are likely to appear (Mehrabian, 2001). Depression is found more frequently in patients who are being treated for alcohol abuse than in the general populace (Lynskey, 1998). Similarly, a higher frequency of alcohol abuse is seen in patients who are being treated for depression (Alpert et al., 1999). It is difficult to isolate alcohol consumption as a cause of depression, however, excessive alcohol consumption may precede the onset of depression and symptoms tend to decrease during a period of abstinence. This suggests alcohol is a factor in depression (World Health Organization, 2004).

Further, the Canadian Institutes of Health Research (CIHR) reports that alcohol and other substances can be used for non-medical reasons by the user in response to growing mental health issues such as depression. They note in these circumstances polysubstance use is common and dangerous to the user (CIHR, 2010). Currently, it is unclear if alcohol and substance use is a causal factor or a result of mental health issues, although there is a strong link between the two.

What are the consequences of alcohol when drivers are fatigued?

Drowsiness increases with the length of time a person has been awake. People who get inadequate sleep or experience poor quality sleep may experience acute or chronic sleepiness (Findley et al., 1989; Cohen et al., 1992; Young et al., 1997). Drowsiness or sleepiness normally refers to the urge to fall asleep as the result of a biological need. It is a physiological state of the body that is irreversible in the absence of sleep (Rani, Reddy, & Mounika, 2019). It is governed by a circadian sleep-wake cycle that makes most people feel sleepy twice a day, at night and in the afternoon (Dement & Vaughn, 1999).

Sleep loss can increase drowsiness and the risk of crash involvement. Alcohol and other medications are known to enhance drowsiness (Horne et al., 2003; Ray et al., 1992; Ceutel, 1995). More importantly, the use of alcohol can exacerbate the performance deficits associated with drowsiness creating a level of risk greater than either factor alone.

Low doses of alcohol relax individuals by slowing the activity of the sympathetic nervous system (Roehrs & Roth, 2001). With larger doses, alcohol can further slow reactions and diminish the ability to perform tasks such as driving. When combined with inadequate sleep, alcohol can become a potent sedative and increase the risk of being involved in a crash.

Prolonged alcohol consumption can potentially induce sleep disorders as it disrupts normal sleep patterns and the time an individual sleeps per night (NIAAA, 1998). The consumption of alcohol within an hour of bedtime may help one to fall asleep more quickly but it is likely to result in inadequate sleep during the second half of the sleep period. This is characterized with being awakened by dreams and having difficulty falling back asleep (Landolt et al., 1996). This disruption in sleep can lead to fatigue and drowsiness during the day as well as a lack of alertness.

Therefore, drivers under the influence of alcohol are at risk for involvement in crashes due to fatigued driving because alcohol has sedating effects that, when combined with fatigue or drowsiness, can exacerbate performance deficits (Horne et al., 2003; Lumley et al., 1987).

What does the Sober Smart Driving Education Program (SSD) contain?

The Sober Smart Driving Education Program contains facts to help Canadians learn about the risks associated with drinking and driving and encourages everyone to speak up and talk about why they choose not to drink and drive.

Key topics discussed on this site include:

- Drinking and its effects on driving
- Magnitude & characteristics of drinking & driving
- Basics of the impaired driving system
- Impaired driver programs & penalties
- Myths & misconceptions about drinking and driving

Each of these topics contains a series of fact sheets structured in a question and answer format which are available for free download and sharing (with attribution). These resources are designed to support the education and prevention efforts of communities, schools, health and road safety professionals and advocacy organizations.

To view more fact sheets, or to get more information about alcohol, its effects on driving skills, and impaired driving, visit **SoberSmartDriving.tirf.ca**.

Traffic Injury Research Foundation

The mission of the Traffic Injury Research Foundation (TIRF) is to reduce traffic-related deaths and injuries. TIRF is a national, independent, charitable road safety research institute. Since its inception in 1964, TIRF has become internationally recognized for its accomplishments in a wide range of subject areas related to identifying the causes of road crashes and developing programs and policies to address them effectively.

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