



**Canadian Centre on Substance Abuse**  
... Working to reduce alcohol- and drug-related harms

**Centre canadien de lutte contre l'alcoolisme et les toxicomanies**  
... œuvrer à la réduction des méfaits liés à l'alcool et aux drogues

In partnership with



**University  
of Victoria**

Centre for Addictions  
Research of BC

# **Caffeinated Alcoholic Beverages in Canada:**

## Prevalence of Use, Risks and Recommended Policy Responses

Kristina Brache  
Gerald Thomas  
Tim Stockwell

Graduate Student, CARBC, UVIC  
Sr. Research & Policy Analyst, CCSA  
Director, CARBC, UVIC

This document was published by the Canadian Centre on Substance Abuse (CCSA).

Suggested citation: Brache, K., Thomas, G., & Stockwell, T. (2012). *Caffeinated alcoholic beverages in Canada: Prevalence of use, risks and recommended policy responses*. Ottawa, ON: Canadian Centre on Substance Abuse.

© Canadian Centre on Substance Abuse 2012.

CCSA, 75 Albert St., Suite 500  
Ottawa, ON K1P 5E7  
Tel.: 613-235-4048  
Email: [info@ccsa.ca](mailto:info@ccsa.ca)

This document can also be downloaded as a PDF at [www.ccsa.ca](http://www.ccsa.ca)

Ce document est également disponible en français sous le titre :  
*La consommation de boissons alcoolisées caféinées au Canada : prévalence, risques et recommandations en matière de politiques*

**ISBN 978-1-927467-12-1**

## Table of Contents

<b>1.0 Introduction.....(00000).....</b>	<b>1</b>
<b>2.0 Method and Approach.....</b>	<b>2</b>
<b>3.0 Background: Energy Drinks and Caffeinated Alcoholic Beverages .....</b>	<b>2</b>
<b>4.0 Prevalence and Patterns of CAB Use in Canada and Internationally .....</b>	<b>3</b>
4.1 National survey data on CAB use.....	3
4.2 Other survey data .....	4
4.2.1 Prevalence of CAB use.....	4
4.2.2 Hand-mixed versus pre-mixed use .....	5
4.2.3 Settings of use and purchase activities .....	5
4.2.4 Motivations for use .....	5
4.2.5 Awareness of warning labels .....	6
4.3 Sales data (pre-mixed CABs) .....	7
<b>5.0 Health and Safety Implications of CAB Use .....</b>	<b>9</b>
<b>6.0 Why Does CAB Use Lead to Increased Risk? .....</b>	<b>9</b>
<b>7.0 Effective Measures for Reducing Alcohol-related Harms .....</b>	<b>10</b>
<b>8.0 Policy Context.....</b>	<b>11</b>
8.1 Implicit and explicit caffeine limits.....	11
8.2 Pricing.....	12
8.3 Labelling .....	12
8.4 Packaging and marketing.....	13
<b>9.0 Recommendations .....</b>	<b>14</b>
9.1 Policy recommendation .....	15
9.2 Regulatory recommendations .....	15
9.3 Educational recommendation .....	16
9.4 Research recommendations .....	16
<b>10. Conclusion .....</b>	<b>17</b>
<b>References .....</b>	<b>18</b>
<b>Appendix I: Definition of Terms .....</b>	<b>24</b>
<b>Appendix II: Best Practices for Messaging for Health-related Behaviour Change .....</b>	<b>25</b>



# Caffeinated Alcoholic Beverages in Canada: Prevalence of Use, Risks and Recommended Policy Responses

Kristina Brache,<sup>1</sup> Gerald Thomas<sup>2</sup> and Tim Stockwell<sup>3</sup>

## 1.0 Introduction

The consumption of caffeinated alcoholic beverages (CABs) has become a topic of interest among health and safety researchers and advocates in several countries, including Canada, because of accumulating evidence linking the combined use of alcohol and caffeine to increases in health and social harms. These harms include increased risk of being highly intoxicated and severely hung over, driving after drinking, riding in a car with someone who has been drinking, and experiencing or perpetrating sexual assault, among others (Simon & Mosher, 2007; O'Brian et al., 2008; Brache & Stockwell, 2010; Price, Hilchey & Darredeau, 2010; Thombs et al., 2010; Weldy, 2010).

Despite explicit warnings about health and safety risks from Health Canada, several provincial health ministries and even energy drink producers,<sup>4</sup> the mixing of energy drinks and alcohol appears to be a common and growing practice, especially with youth and young adults in Canada.

The two major categories of CABs in Canada are those that are *pre-mixed* and sold in liquor stores or licensed establishments, and those that are *hand mixed* by consumers themselves. This distinction is important both because patterns of use vary according to type of CAB, and because the hand mixing of caffeine and alcohol presents special challenges for attempts to address the behaviour through policy and regulation.

This policy brief summarizes what is known about the use of caffeinated alcoholic beverages in Canada, discusses research on the negative health and safety outcomes associated with the

---

<sup>1</sup> Graduate Student, Centre for Addictions Research of British Columbia, University of Victoria.

<sup>2</sup> Senior Research & Policy Analyst, Canadian Centre on Substance Abuse, Ottawa, Ontario.

<sup>3</sup> Director, Centre for Addictions Research of British Columbia, University of Victoria; Affiliate Scientist, Canadian Centre on Substance Abuse, Ottawa, Ontario.

<sup>4</sup> Warnings include: Health Canada. (2005). Safe use of energy drinks. Retrieved from <http://www.hc-sc.gc.ca/hl-vs/iyh-vsv/food-aliment/boissons-energ-drinks-eng.php>; Eat Right Ontario. (n.d.). Energy drink FAQs. Retrieved from <http://www.eatrightontario.ca/en/ViewDocument.aspx?id=196>; HealthLink BC. (2010). *Energy drinks* (HealthLink BC file #109). Retrieved from <http://www.healthlinkbc.ca/healthfiles/pdf/hfile109.pdf>; Red Bull states “do not mix with alcohol” directly on the can.

mixing of caffeine and alcohol, sets out the basic contours of effective alcohol control policies, and offers specific recommendations to help reduce the potential harms from the consumption of CABs in Canada.

## 2.0 Method and Approach

This paper combines a review of research on effective policies for the control of alcohol use with a scan of the current policy and regulatory environment to generate a set of evidence-based recommendations to reduce the prevalence of CAB use (and, therefore, CAB-related risk across the population). Although there is little published research on interventions that address the combined use of alcohol and energy drinks directly, reviews of effective policies for addressing problematic alcohol use provide guidance with regards to population-level responses that could reduce the co-administration of caffeine and alcohol (Babor et al., 2010).

The published research suggests that controls on economic availability (i.e., taxes and prices) and physical availability (e.g., days and hours of sale) are most effective for reducing consumption and, by extension, alcohol-related harms and costs. Other measures, such as warning labels and public education campaigns, generally have less evidence of effectiveness but can influence knowledge and awareness—thus complementing policy and regulatory controls on availability (Babor et al., 2010).

Maximum effectiveness is attained, however, when policy, regulatory and educational interventions are used in combination to shift cultural norms and behaviour over the long term (Babor et al., 2010; Linowki & DiFulvio, 2011). Sustained and coordinated methods employing multiple initiatives (such as the approach proposed in this paper) are what changed cultural norms and eventually behaviour around both smoking and impaired driving during the last 20–30 years (Carson, et al., 2011).

## 3.0 Background: Energy Drinks and Caffeinated Alcoholic Beverages

The existence of coffee-based cocktails shows that combining caffeine and alcohol is not new. However, the emergence of energy drinks in the late 1990s added a new dimension to this phenomena by giving consumers—most often youth and young adults—an affordable and convenient source of sweet-tasting products containing large amounts of caffeine that mix easily into cocktails. Energy drinks are marketed to provide a burst of energy and/or enhance alertness; while the principle stimulant ingredient is caffeine, energy drinks often include other ingredients such as guarana, which is a natural source of caffeine. Energy drinks may or may not also include high doses of sugar (or a sugar substitute), B vitamins, amino acids (e.g., taurine or l-carnitine) and plant/herbal extracts (e.g., ginseng, milk thistle, ginko biloba). Common energy drinks containing caffeine include major brands such as Red Bull™ and Monster™, although there are now dozens of products on the market and more appearing all the time.

Since the introduction of the first energy drink in Canada in 1997, consumption of these and other similar “functional beverages”<sup>5</sup> has increased dramatically, accounting for 4% of the total soft drink market and registering more than \$287 million in sales in 2006 (Agriculture and Agri-Foods Canada, 2008). The Canadian Medical Association recently published an editorial expressing concern about the growing use of highly caffeinated energy drinks, especially among youth (MacDonald, Stanbrook & Hebert, 2010). In addition, Health Canada recently reclassified energy drinks from a natural health product to a food to limit caffeine levels, enhance labelling requirements and increase regulatory oversight (Fitzpatrick, 2011).

## **4.0 Prevalence and Patterns of CAB Use in Canada and Internationally**

Caffeinated alcoholic beverages fall into two major categories: hand-mixed CABs made by combining caffeinated beverages (e.g., energy drinks) and alcohol in various forms, and pre-mixed CABs produced for sale by beverage producers. National data on the use of caffeinated alcoholic beverages comes from two sources: survey data from the Canadian Alcohol and Drug Use Monitoring Survey (CADUMS) and sales data for pre-mixed products sold from provincial liquor authorities.

### **4.1 National survey data on CAB use**

The CADUMS is an annual telephone survey of the Canadian household population age 15 years and over administered by Health Canada. Several questions relating to the combined use of alcohol and energy drinks were included in the 2010 survey, with national prevalence estimates reported in Table 1. While these data do not distinguish between hand-mixed and pre-mixed CAB use, they do indicate several key findings. First, CAB use appears to be more common among male drinkers than females drinkers (although there is no statistically significant difference in rates of use between young adult males and females), and use among young adults is approximately four to five times higher than use among the general population age 15 years and older.

---

<sup>5</sup> Functional beverages are defined by the beverage industry as drink products that are non-alcoholic, ready to drink and include in their formulation non-traditional ingredients. These include herbs, vitamins, minerals, amino acids or additional raw fruit/vegetable ingredients designed to provide specific health benefits that go beyond general nutrition. Sports and performance drinks, energy drinks, ready-to-drink teas, enhanced fruit drinks, soy beverages and enhanced water, among others, are some of the products sold as functional beverages.

**Table 1: Percentage (with 95% confidence intervals) of past 30-day drinkers reporting drinking alcohol and an energy drink in the past 30 days, general household population age 15 years and older, Canada, 2010**

	Male	Female	Total
Young adult (18/19–24)	12.62 (8.78–16.47)	9.13 <sup>†</sup> (5.39–12.86)	11.05 (8.35–13.75)
General population (15+)	3.19 (2.18–4.20)	1.66 <sup>†</sup> (1.05–2.27)	2.47 (1.86–3.07)

<sup>†</sup> Result should be interpreted with caution due to lack of precision in the estimate.

Note: Young adult = 18–24 in Alberta, Manitoba and Quebec; 19–24 elsewhere in Canada.

Source: Health Canada. (n.d.). Canadian Alcohol and Drug Use Monitoring Survey, 2010 microdata file, analysis by CARBC.

## 4.2 Other survey data

Researchers in Canada recently conducted two small surveys of CAB use by university students: one in Western and one in Eastern Canada. The first occurred in British Columbia at the University of Victoria (UVic) in 2009–10 (Brache & Stockwell, 2011). The second occurred at Dalhousie University in Halifax in 2009 (Price et al., 2010). While these data do not provide representative results that can be generalized to the Canadian population, they do supply greater detail on the use of CABs by young adult students, including the relative proportions of consumption that are pre-mixed and hand mixed, which is useful for informing policy discussions. Data from these student surveys are presented below along with other data from international sources provided for purposes of comparison.

### 4.2.1 Prevalence of CAB use

In an online survey of 465 college students at UVic, 23% reported consuming any type of CAB in the past 30 days (Brache & Stockwell, 2011). This is approximately double the prevalence rate reported for young adults from the CADUMS survey, which may indicate that CAB use is higher among students in post-secondary institutions. On average the students surveyed consumed CABs on two days in the past 30 days and reported consuming two CABs on a typical drinking occasion. In the survey of 72 young adult energy drink consumers conducted at Dalhousie University, 75% reported consuming CABs in their lifetime and 22% reported consuming alcohol during their most recent use of energy drinks (Price et al., 2010). While these results are based on a small sample, the published results are similar to the prevalence rates found in the larger sample of students from UVic.

Research from the United States reports similar prevalence rates, with one study finding that 24% of students who had consumed alcohol in the past-year had consumed CABs in the past 30 days (O'Brien et al., 2008). A second study found that 26% of students who drank in the past year combined alcohol and energy drinks in the past month (Miller, 2008a). Other research internationally reveals somewhat higher prevalence rates. For example, 48.4% of a sample of Italian university students reporting using CABs in the last 30 days (Oteri et al., 2007). From these data it appears as though about one in four students in post-secondary institutions consumed caffeinated alcoholic beverages in the past 30 days, indicating that CAB use is not uncommon among young adult students in a variety of countries, including Canada.



#### **4.2.2 Hand-mixed versus pre-mixed use**

The majority (61%) of the UVic students who had consumed CABs in the past 30 days had only consumed hand-mixed beverages and the remainder (39%) had consumed pre-mixed CABs in the past 30 days (Brache & Stockwell, 2010). Because a large proportion of consumption appears to be of the hand-mixed variety, these data suggest that policies and programs to deal with CAB use need to be directed at both hand-mixed and pre-mixed beverages to be effective at reducing risk and harm. While pre-mixed use may be addressed through policy and regulatory controls such as limits on caffeine levels, hand-mixed CAB use will be harder to control due to relatively fewer policy and regulatory options for affecting consumer behaviour. That said, there are meaningful options for reducing access to the products used to create hand-mixed CABs, including restricting or prohibiting the sale of regular energy drinks in high-risk environments such as bars and clubs (see recommendations below).

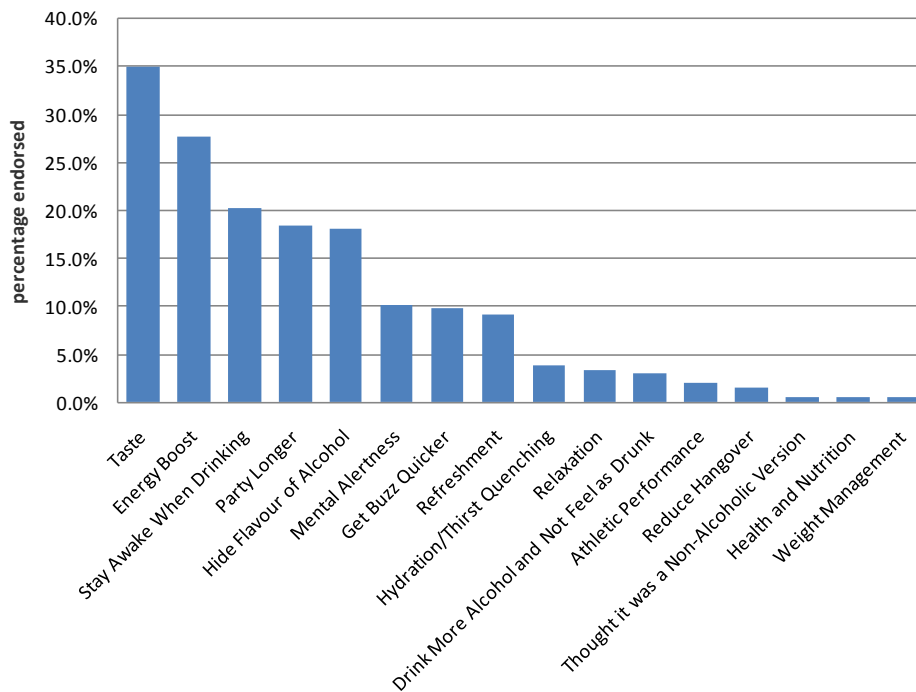
#### **4.2.3 Settings of use and purchase activities**

Students from the western university sample using CABs reported consuming these beverages at a party (44.6%), in a friend's home (32.4%), at a bar (38.4%), at school (16%), or in their own home (15.7%). In comparison, participants reported consuming non-alcoholic energy drinks more often at school (45.1%) and in their own home (40.1%). CABs were most often purchased by students at private (61.2%) or government (59.2%) liquor stores, less often at bars (38.8%), and rarely at restaurants (10.2%) (Brache & Stockwell, 2010). These data indicate that the majority of drinkers consume CABs in social circumstances, including approximately 40% of users who drink them in licensed establishments. Therefore, to reduce use and risk, there is a need to control access to these beverages in clubs and bars that are well recognized as high-risk drinking environments.

#### **4.2.4 Motivations for use**

Students from UVic indicated numerous reasons for consuming CABs. The most common reported motivations for use were because they enjoyed the taste (35%) and to get an energy boost (27.7%) (Brache & Stockwell, 2010). Other reasons for using CABs were more troubling for health and safety, including: to stay awake when drinking (20.2%); to party longer (18.4%); to get a buzz quicker (9.5%); and to drink more without feeling drunk (3%). (See Figure 1 below for the complete list of reasons.)

**Figure 1: Proportion of student CAB users endorsing various rationales for use, University of Victoria, 2010**



Source: Brache & Stockwell, 2010.

Similar to rationales reported for drinking CABs in Canada, research conducted in Australia found that young adults drink caffeinated beverages in combination with alcohol to extend their nights out, to have more energy to party longer, and because they are ‘cool’ to drink while in a club (Jones & Barrie, 2009). This research also identified the role of social image in CAB use, including that they are used as a group bonding experience and to make nights out more fun. This evidence suggests that young adults combine alcohol and caffeine for a number of reasons including to feel more energetic, to stay awake and party longer when drinking, and to get a buzz quicker—all of which imply higher risk drinking and provide further evidence of a need to intervene to reduce the prevalence of this high-risk behaviour.

#### **4.2.5 Awareness of warning labels**

A large majority (86%) of the students from UVic who consumed CABs were aware of the “do not consume with alcohol” warning printed on some energy drink labels (Brache & Stockwell, 2010). Levels of awareness were much lower among respondents who did not report CAB use in the past 30 days (approximately 40%) than those who did (86%), indicating that current warnings about mixing alcohol and energy drinks are well known but not effective for changing behaviour. This suggests that warning labels alone are not enough to deter the mixing of caffeine and alcohol and that better efforts should be made to inform

consumers of the added risk of CAB use.<sup>6</sup> As stated previously, such educational efforts need to be accompanied by strong policy and regulatory initiatives under a sustained and coordinated approach to create changes in the drinking culture.

### **4.3 Sales data (pre-mixed CABs)**

To better understand the trends of CAB use in Canada, we requested sales data on the newer generation of caffeinated alcoholic beverages from all 10 provinces and the Yukon back to April 2005. We received partial or full data from liquor authorities in seven jurisdictions to October 2010; CABs have never been sold in the Yukon, while liquor authorities in two jurisdictions declined our invitation to share information for this project and one did not respond to our request.<sup>7</sup>

Based on the data from participating jurisdictions, overall sales of pre-mixed caffeinated energy drinks have increased substantially over a five-year period (see Figure 2). CAB sales follow a seasonal pattern with peaks evident each year in the summer months and smaller peaks during the winter holiday season. While sales of pre-mixed CABs have increased over time, some of this growth may be owing to new products entering the market rather than increasing demand for products already available. For example, the large increase in sales beginning in April 2007 corresponds with the introduction of a new product line in several jurisdictions. To address this potentially confounding factor in the data, Figure 3 illustrates trends in demand for CABs for five provinces over a time period when product lines were stable. These data show a steady upward trend of sales of pre-mixed CABs between May 2007 and August 2010, verifying that demand for existing pre-mixed CAB products is indeed growing in most of Canada.

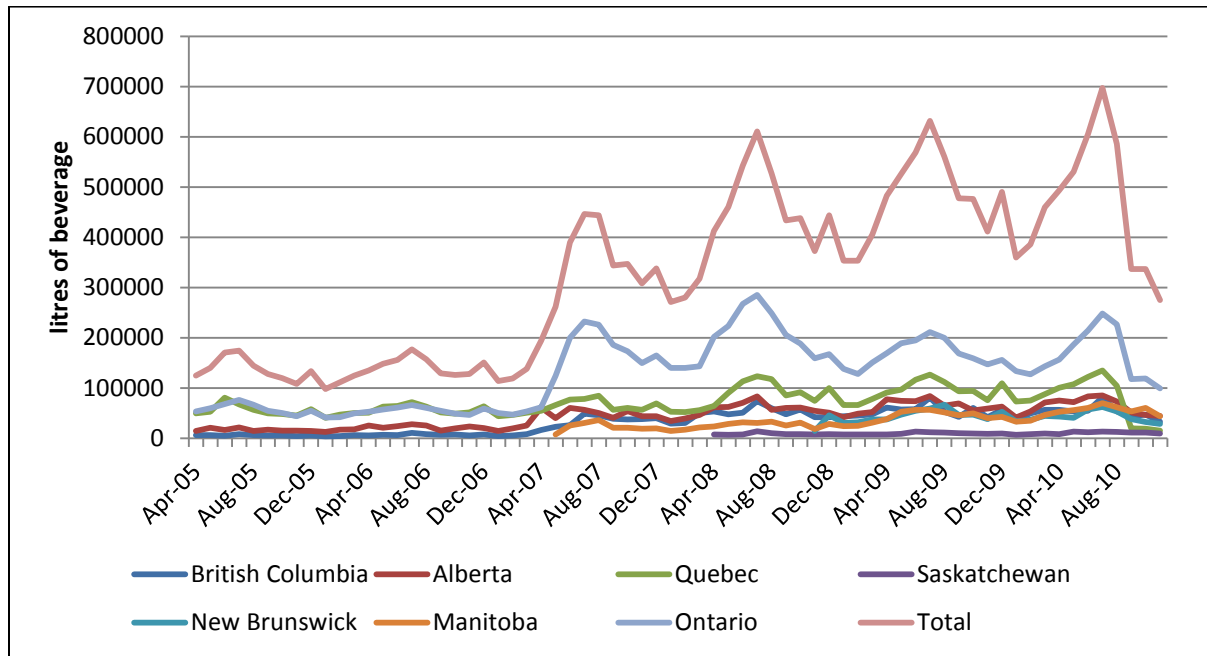
From these data, it is clear that the use of pre-mixed CABs increased in several provinces between 2005 and 2010. However, it is also important to keep in mind that pre-mixed CABs likely account for a minority of CAB consumption and that to address this risky behaviour both pre-mixed and hand-mixed CAB use will need to be addressed through policy, regulation and education.

---

<sup>6</sup> Employing best practices for messaging for health related behaviour change, such as those listed in Appendix II (Stead et al., 2009), could improve the impact of public and school based education campaigns.

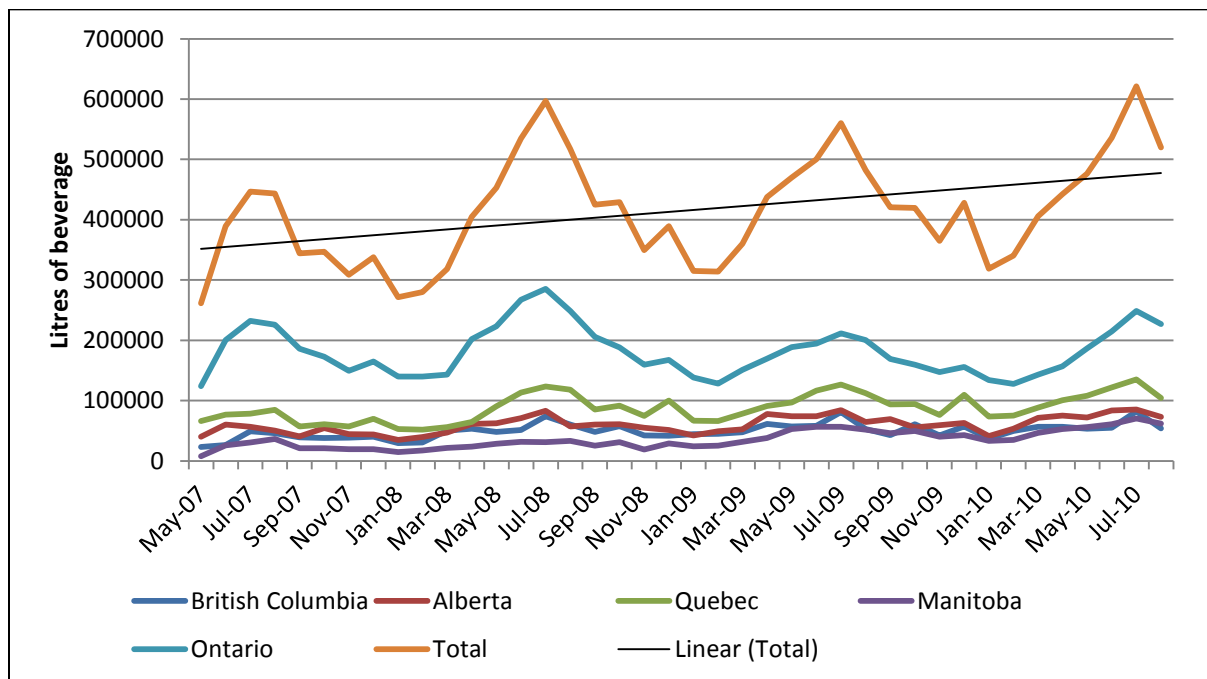
<sup>7</sup> The seven jurisdictions that shared sales data for this policy brief accounted for just under 95% of the Canadian population in 2010.

**Figure 2: Sales of pre-mixed caffeinated alcoholic beverages, April 2005 to November 2010**



Sources: Provincial liquor authorities, data on file with authors.

**Figure 3: Trends in sales of pre-mixed caffeinated alcoholic beverages in jurisdictions with stable product lines, May 2007 to August 2010**



Sources: Provincial liquor authorities; sales data on file with authors.

## 5.0 Health and Safety Implications of CAB Use

In a non-randomized survey of 465 university students at a western Canadian university who reported ever consuming CABs, 46% reported experiencing negative physical symptoms in the past 12 months after combining alcohol and energy drinks (Brache & Stockwell, 2010). The most common symptoms experienced were dehydration (71.6%), a bad hangover (68.8%) and vomiting (34.8%). In other international research, young adults have reported severe negative effects of CAB use, including heart palpitations and other adverse reactions (Jones & Barrie, 2009; SAMHSA, 2011). Research also indicates that consumption is positively associated with a variety of risky behaviour and alcohol-related harms (Miller, 2008a; Woosley & Kensinger, 2009). In Canadian and American college students, the consumption of CABs is associated with both increased alcohol consumption (O'Brien et al., 2008; Brache & Stockwell, 2010; Price et al., 2010; Thombs et al., 2010) and increased energy drink consumption (Malinaukas et al., 2007).

Along with increased alcohol consumption, college and university students who consume CABs experience a significantly higher prevalence of negative alcohol-related consequences compared to those who consume alcohol alone (O'Brien et al., 2008; Thombs et al., 2010). For example, CAB drinkers have a higher likelihood of being sexually assaulted or committing sexual assault, riding in an automobile with a driver who is under the influence of alcohol, driving while under the influence of alcohol themselves, being hurt or injured, and requiring medical treatment (O'Brien et al., 2008). These findings persisted even after adjusting for the amount of alcohol consumed. Further, a field study conducted in an American college bar district found that compared to other customers, CAB drinkers were three times as likely to be leaving the bar legally intoxicated ( $BAC \geq 0.08$ ), and four times as likely to state that they were intending to drive a car after drinking (Thombs et al., 2010).

Finally, research in Canada found that the association between increased CAB consumption, increased alcohol use and higher rates of alcohol-related negative consequences remained significant even after controlling for the individual's risk taking propensity (Brache & Stockwell, 2011). This finding suggests that consumption of CABs increases risk over and above what would be expected based on a person's overall tendency to otherwise engage in risky behaviours.

## 6.0 Why Does CAB Use Lead to Increased Risk?

Researchers propose several mechanisms to explain the increased risk and harm from CAB consumption. These include decreased subjective awareness of intoxication; caffeine masking the effects of alcohol leading to longer and more active drinking sessions; and CAB use facilitating greater alcohol intake.

Regarding subjective awareness of intoxication, research has shown that consumers of CABs have a significant reduction in perception of intoxication compared to the consumers who drink alcohol alone (Ferreira et al., 2006). Despite these subjective feelings of being less

intoxicated, researchers found that the ingestion of caffeine did not reduce alcohol-caused deficits in motor coordination or visual reaction time, nor did it alter the participant's breath alcohol concentration. Based on this theory, consumers may be more likely to participate in risky behaviours (such as overconsumption or drinking and driving) because they perceive themselves to be less intoxicated.

A second mechanism that may explain increased risk of harm is that caffeine may mask some of the central nervous system depressant effects of alcohol, potentially leading to longer and more active drinking sessions. Researchers have investigated the cognitive and motor functioning of individuals under the combined influence of alcohol and caffeine. Findings are mixed with some research suggesting that the stimulant effects of caffeine may lessen the negative effects of alcohol at low levels of intoxication (Ferreira, Quadros, Trindade, Takahashi, Koyama & Souza-Formigoni, 2004). Other research found deficits in some areas of functioning but not in others. For example, Marcziński and Fillmore (2003) determined that caffeine can counteract alcohol's effect on response execution but had no impact on inhibitory control. Further, Marcziński & Filmore (2006) found that CAB consumption counteracts some of alcohol's effects on performance (i.e., response speed) but not others (i.e., response accuracy). It is plausible that CAB consumption masks the effects of alcohol in select areas of functioning through the attenuation of some of alcohol's physiological effects. This could lead the consumer to continue drinking and be more active despite being physically impaired and experiencing serious deficits in some important areas of functioning.

The increased risk-taking behaviour associated with CABs may also be due to the fact that drinkers tend to ingest more alcohol when consuming CABs than they do when drinking alcohol without the caffeine (O'Brien et al., 2008, Brache & Stockwell, 2010; Price et al., 2010; Thombs et al., 2010). Alcohol consumption, at heavier doses, is associated with decreased activity level, lowered inhibition and slowed response speed (Ferreira et al., 2006; Marcziński & Fillmore, 2003, 2006). It is also associated with increased disposition to take risks (Cherpitel, 1999). The use of energy drinks when drinking alcohol increases some aspects of alertness and decreases subjective perceptions of intoxication both of which could add to greater alcohol consumption per drinking occasion. The combined effects of increased alertness and activity level, increased intoxication from additional alcohol use, and an increased disposition to take risks likely explain the increased risk-taking behaviour and harms associated with CAB use.

## 7.0 Effective Measures for Reducing Alcohol-related Harms

Babor and colleagues (2010) recently conducted a systematic review of interventions for addressing alcohol-related harms and costs. Their assessment of the published literature suggests that policies that limit the economic availability (i.e., taxes and prices) and physical availability (e.g., outlet density, hours and days of sale) of alcohol are most effective at controlling consumption and reducing alcohol-related harms at the population level (Babor et al. 2010, Chapters 6 and 7). Other relatively effective measures include initiatives that make drinking environments safer (e.g., server training programs) (Chapter 10), drinking and driving countermeasures (Chapter 11), and treatment and early intervention services

(Chapter 14). Less effective measures include public and school-based educational initiatives and other persuasion-based approaches (e.g., warning labels) that, while capable of increasing awareness and influencing attitudes, have been shown to have little if any effect on changing drinking behaviours particularly when used in isolation (Chapter 13).

Evidence from successful campaigns to address such large-scale public health issues such as drinking and driving and tobacco use suggest that population-level changes in behaviour are possible when coordinated suites of policy, regulatory and educational initiatives are implemented over the medium- to long-term (i.e., a decade or more) with the goal being to shift cultural norms (Babor, et al., 2010; Carson, et al., 2011). In the next two sections we review the current policy context in Canada regarding the sale and use of CABs, which, along with the evidence on effective interventions to address risky drinking set out above, we then use to inform the development of specific policy, regulatory and educational recommendations to reduce the potential harms from the use of CABs in Canada.

## 8.0 Policy Context

A newer generation of pre-mixed CABs has been on the market in Canada since March 2000 when the first product was introduced in Alberta. There was only one CAB for sale in Canada until a second major product line was introduced in March 2007, first in Alberta and then in other jurisdictions. Since then two other products have been brought to market in Canada with more limited distribution. The following section outlines various policies that are in place to manage the sale of these products both federally and provincially.

### 8.1 Implicit and explicit caffeine limits

In January 2009, the Canadian Food Inspection Agency (CFIA) asked Health Canada to verify the legal status of alcoholic beverages containing added vitamins, amino acids and caffeine under the *Food and Drugs Act* (Schmidt, 2010). In early 2010, Health Canada issued a formal directive to all provincial and territorial liquor boards clarifying that the addition of vitamins or amino acids is not allowed and only caffeine from natural sources (e.g., coffee, cacao, guarana) are allowed in alcoholic beverages for sale in Canada (Schmidt, 2010).

At approximately the same time, the Liquor Control Board of Ontario (LCBO) undertook an independent review of the CAB issue; in July 2009, it imposed a cap of 30 mg of caffeine per serving on all products containing alcohol sold in Ontario and gave beverage manufacturers several months to comply. To put this into perspective, a typical can of caffeinated cola contains 30–35 mg of caffeine and a typical cup of drip coffee contains approximately 100–120 mg. Since that time, other liquor authorities (such as the Nova Scotia Liquor Corporation) have followed the LCBO's lead on allowable levels of caffeine. In response to the Health Canada directive and the provincial policies capping caffeine content, the producers of pre-mixed caffeinated alcoholic beverages reformulated their products in the summer of 2010 to substantially reduce the amount of caffeine. For example, one product went from 98 to 30 mg of caffeine per serving; another producer removed all but traces of caffeine from its product.

## 8.2 Pricing

Several observers in the United States and Australia have raised concern about the relatively low price of alcoholic energy drinks relative to other consumer drinks (Simon & Mosher, 2007; Jones, 2011). The prices of CABs relative to regular energy drinks in several jurisdictions are presented in Table 2 below. This information confirms that the prices of alcoholic and non-alcoholic energy drinks are similar in Canada even though the risks created by alcoholic varieties are arguably higher than those associated with regular energy drinks.

**Table 2: Retail prices, select jurisdictions, Canada, circa April 2011**

	British Columbia	Manitoba	Ontario	Quebec	New Brunswick
Regular Rockstar™ energy drink	\$3.29	\$2.99	\$3.19	\$3.19	\$3.19
Rockstar+vodka™ cooler	\$3.29	\$3.29	\$3.15	\$3.45	\$3.74

Source: Compiled by authors; prices from government liquor authority and leading grocery store chains in each jurisdiction.

Based on this comparison of prices of regular energy drinks and CABs, we recommend that government liquor authorities increase prices of pre-mixed CABs in accordance with their higher risk potential. This is a complicated matter, however, as current CAB pricing also creates incentives for the consumption of pre-mixed CABs because consumers do not need to purchase alcohol separately from regular energy drinks to create caffeinated cocktails. As a result, pre-mixed CABs provide the cheapest option for consuming caffeine in combination with alcohol in Canada. Because the pre-mixed CABs have relatively low levels of caffeine compared to regular energy drinks, these pricing incentives may reduce risk but only if consumers use pre-mixed CABs in place of hand-mixed varieties, which, if mixed from regular energy drinks, will contain higher levels of caffeine.

## 8.3 Labelling

In October 2011, Health Canada reclassified regular (non-alcoholic) energy drinks as a food to be regulated under the *Food and Drugs Act* where previously they were classified as natural health products. The reclassification was made to facilitate greater regulatory oversight, including placing limits on the amount of caffeine in regular energy drinks, requiring that all ingredients (including caffeine content) be listed on labels, and requiring warnings to not mix with alcohol. Pre-mixed caffeinated alcoholic beverages are also regulated under the *Food and Drugs Act*; however, because they are sold as alcoholic beverages they are only required to list alcohol content on product labels. Thus, current labelling requirements are inconsistent and seem to be less strict for pre-mixed CABs, which are arguably more dangerous than regular energy drinks because they contain alcohol in addition to caffeine.

A second labelling issue relates to warnings about mixing energy drinks and alcohol that is now required on all regular energy drink products (e.g., Red Bull) sold in Canada. Research from British Columbia suggests that a large proportion of young adult drinkers who regularly



consume CABs are already aware of warnings to not mix alcohol and energy drinks but continue to engage in this behaviour regardless (Brache & Stockwell, 2010). Further, the existence of pre-mixed CABs on the market may create the impression that combining alcohol and caffeine is approved by government regulatory bodies and therefore safe.

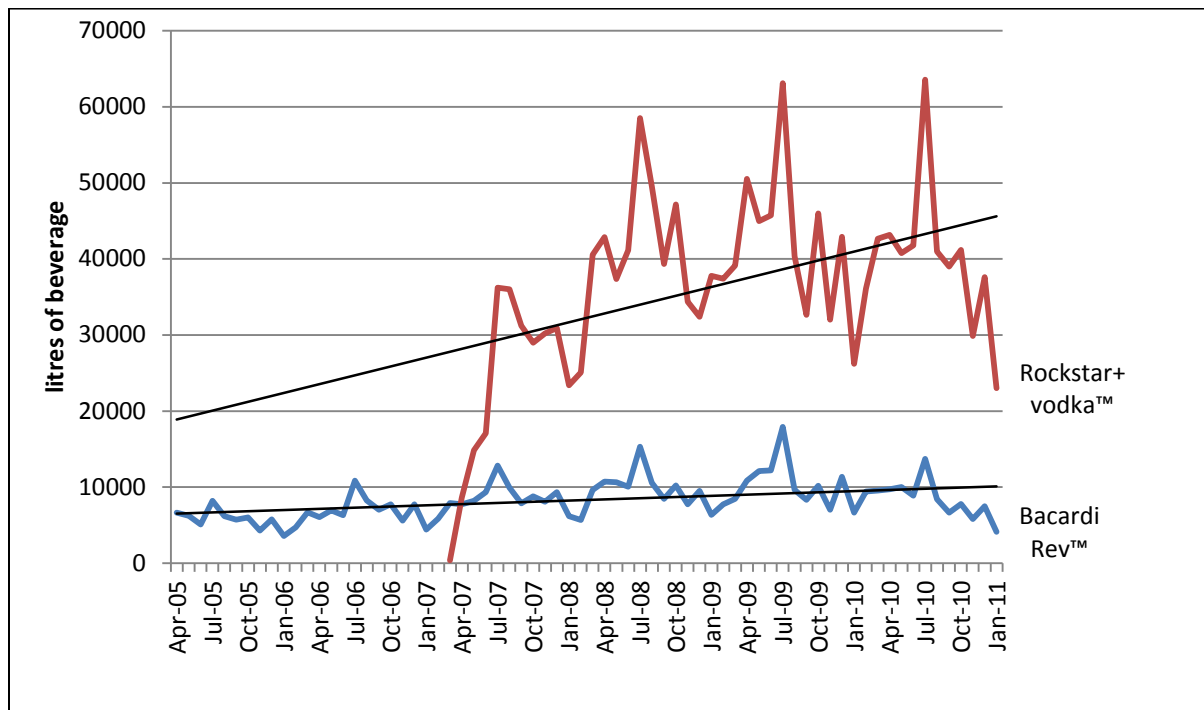
#### **8.4 Packaging and marketing**

Some pre-mixed alcoholic energy drinks are packaged almost identically to their non-alcoholic versions (e.g., Rockstar+vodka™). As a result, they may be mistaken for their non-alcoholic versions by law enforcement agents, store owners, consumers and parents (Simon & Mosher, 2007). Research conducted on CAB use in western Canadian university students found that a small number of respondents reporting that they drink alcoholic energy drinks because they are indistinguishable from regular energy drinks and can be consumed clandestinely in public places where alcohol consumption is prohibited (Brache & Stockwell, 2010). Further, the marketing of regular energy drinks is targeted toward adolescent and young adult populations, including college students, and energy drinks are often provided free of charge at different college events, whether for studying, partying or participating in sports. College students are also hired by energy drink producers to market their beverages among their peers (Simon & Mosher, 2007). The successful direct marketing techniques used by energy drink companies could indirectly influence the consumption of alcoholic energy drinks if the products are packaged and branded in similar ways to their non-alcoholic namesakes.

As well, due to their close association with similar non-alcoholic products, some CABs may benefit from the non-traditional marketing efforts used to promote regular energy drinks with youths and young adults. Indeed, the difference in growth of sales of Bacardi Rev™, which is packaged and marketed more like a traditional cooler, and Rockstar+vodka™, which is packaged almost identically to its non-alcoholic namesake, may be explained by the non-traditional marketing tactics used to promote Rockstar™ energy drinks amongst youth and young adults (Figure 4).

To summarize, current policies related to caffeinated alcoholic beverages have reduced the amount of caffeine in pre-mixed varieties, leading to potentially safer products. However, the prices of pre-mixed CABs are not significantly different from regular energy drinks even though they are arguably more risky because they also contain alcohol. Further, labelling requirements for regular energy drinks are more stringent than those for their alcoholic equivalents, despite the added risks associated with beverages that combine caffeine and alcohol.

Figure 4: Comparison of sales of CAB products, British Columbia, 2005–2010



Source: BC Liquor Distribution Branch, data on file with authors.

## 9.0 Recommendations

In October 2011, Health Canada released a consultation document entitled: Health Canada’s Proposed Approach to Managing Caffeinated Energy Drinks (Health Canada, 2011). The document set out several recommended policy changes related to implementing the decision to regulate energy drinks as food rather than as natural health products. Among other things, the proposed approach suggests that warnings about mixing energy drinks and alcoholic beverages be placed on all energy drinks. Further, the document proposes that pre-mixed CABs be prohibited for sale in Canada. Health Canada received a total of 71 responses during the consultation period with every response favouring the prohibition of pre-mixed CABs (Health Canada, 2012).

While many appear to believe that ending the sale of pre-mixed CABs will reduce the risks and harms associated with caffeinated alcoholic beverages, it can be argued that removing these relatively safer products with regulated low caffeine levels from the market could lead consumers to shift to hand-mixed CABs which, for the reasons explained above, likely involve more risk. Therefore, if Health Canada moves to prohibit the sale of pre-mixed CABs in the coming months, it will be important that significant resources also be devoted to policies and programs to discourage the hand mixing of alcohol and energy drinks among consumers.

While we applaud Health Canada's recent efforts to better regulate the sale and consumption of regular energy drinks, gaps still remain with regards to CABs. One requirement in the regulations is that Health Canada is proposing to require manufacturers to add a warning that energy drinks should not be mixed with alcohol (Health Canada, 2011). However, several energy drinks makers were already complying with this requirement and, as research data from British Columbia shows, the vast majority of young adult CAB users surveyed were aware of warnings about mixing energy drinks and alcohol, but were not deterred from engaging in the behaviour (Brache & Stockwell, 2010).

In light of the findings regarding effective interventions for reducing alcohol consumption and related harms and costs, and the survey of the current legal and policy environment provided above, the following suite of policy, regulatory and educational recommendations are made with the goal of reducing the health and safety problems related to CAB use in Canada.

### 9.1 Policy recommendation

- Increase the prices of pre-mixed CABs to reflect their higher risk profile vis-à-vis regular energy drinks. These price increases should not be high enough, however, to take away current price incentives that promote the use of lower caffeine content pre-mixed CABs over hand-mixed CABs.<sup>8</sup>

### 9.2 Regulatory recommendations

- Implement regulations to discourage and/or prohibit sales of regular energy drinks and/or pre-mixed CABs in high-risk environments (i.e., bars and clubs). This could involve, for example, setting an upper limit on the caffeine content of regular energy drinks available for sale in licensed premises (e.g., max 30 mg/serving) or prohibiting the sale of energy drinks altogether in these settings.
- Require mandatory labelling on *both* regular energy drinks and pre-mixed CABs to convey more prominent warnings about the risks associated with mixing caffeine and alcohol, and require that alcohol and caffeine content be conveyed on all pre-mixed CABs for sale in Canada.
- Implement regulations for packaging to clearly differentiate between caffeinated alcoholic beverages and regular energy drinks to reduce the chances that pre-mixed CABs can be consumed clandestinely.

---

<sup>8</sup> The available evidence suggests that the majority of CAB use occurs in unregulated environments; this means that certain interventions, such as pricing and labelling, could provide the most effective means of changing behaviour.

### 9.3 Educational recommendation

- Develop and implement a modern, proactive public education campaign to discourage consumption of both hand-mixed and pre-mixed CABs. Such a campaign should be based on best practices for messaging for health-related behaviour change (see Appendix II) and could be modelled after work already done in Quebec by Educ’alcohol ([http://educalcohol.qc.ca/wp-content/uploads/2011/12/Energy\\_drinks.pdf](http://educalcohol.qc.ca/wp-content/uploads/2011/12/Energy_drinks.pdf)). Such a campaign should also make explicit reference to the new Canadian low-risk alcohol drinking guidelines and emphasize the enhanced risks faced by youth and young adult drinkers (Butt et al., 2010).

### 9.4 Research recommendations

- Given the association of CAB use with increased risk of harms, consideration should be given to using CAB use as a marker for risky or hazardous alcohol use in screening protocols, especially among youth and young adults. Further, there should be an increase in surveillance and research on CAB use and its health and safety consequences to better characterize patterns of use, risks and harms, and to inform the development and evaluation of policy initiatives.
- Create research initiatives to assess the consumption of CABs and their associated risks and use this information to monitor and evaluate policies and programs for reducing the harms and costs associated with the mixing of energy drinks and alcohol.

These recommendations align with the evidence on effective interventions to reduce alcohol related harms and costs as set out in Table 3.

**Table 3: Recommendations with associated rationales and supporting research**

Recommendation	Rationale	Research
<u>Policy (economic availability):</u> Increase the prices of pre-mixed CABs to reflect their higher risk profile vis-à-vis regular energy drinks. These price increases should not be so high, however, to take away current price incentives that promote the use of pre-mixed CABs over hand-mixed CABs.	Alcohol is similar to many other goods in that when the price goes up, people consume less. Increasing the price of alcoholic drinks to reduce consumption through taxation or direct price increases is one of the most effective ways to reduce consumption and alcohol-related harms/costs at the population level.	Babor, et al., 2010: Chapter 6: Pricing and taxation
<u>Regulatory (physical availability):</u> Implement regulations to discourage and/or prohibit sales of non-alcoholic energy drinks and/or pre-mixed CABs in high-risk environments (i.e., bars and clubs). This could involve, for example, setting an upper limit on the caffeine content of regular energy drinks available for sale in licensed premises (e.g. max 30 mg/drink) or prohibiting the sale of energy drinks altogether.	Reducing physical access to goods in the marketplace discourages consumption. Prohibiting the sale of regular energy drinks or limiting the amount of caffeine allowed in energy drinks for sale in bars and clubs would decrease the consumption of caffeine and alcohol in these high-risk environments.	Babor, et al., 2010: Chapter 7: Physical availability
<u>Regulatory (public information/persuasion):</u> Require mandatory labelling on both regular energy drinks and pre-mixed CABs to convey more prominent warnings about the dangers of consuming caffeine and alcohol, and require that alcohol and caffeine contents be	While warning labels have not been shown to change behaviour in isolation, they can increase knowledge and change attitudes about specific behaviours and therefore can play a role alongside other policy, regulatory and educational interventions to shift the	Babor et al, 2010: pgs. 192–193 for evidence that warning labels can increase knowledge and change attitudes.

<p><i>conveyed in standard drinks and cups of coffee equivalent on all pre-mixed CABs.</i></p>	<p>drinking culture. Further, most products sold for consumption in Canada list contents on their packaging and there is no compelling reason why caffeinated alcoholic beverages should be exempt from this requirement.</p>	
<p><b>Regulatory (marketing and promotion):</b> <i>Implement regulations for more responsible packaging (e.g., packaging to clearly differentiate caffeinated alcoholic beverages from regular energy drinks).</i></p>	<p>Anecdotal evidence and limited research evidence suggests that alcoholic energy drinks packaged almost identically to their non-alcoholic namesakes are being consumed by youth and young adults, and this use is difficult to detect because the products are believed to be non-alcoholic energy drinks. Requiring companies to package their products differently would assist in differentiating between the alcoholic and non-alcoholic versions of energy drinks.</p>	<p>News report providing anecdotal evidence for inability to distinguish alcoholic and non-alcoholic energy drinks: <a href="http://www.simcoe.com/print/1037897">http://www.simcoe.com/print/1037897</a>. Same recommendation made by the Marin Institute in: Simon, M. &amp; Mosher, J. (2007). <i>Alcohol, energy drinks, and youth: A dangerous mix</i>. Research conducted on CAB use in western Canadian university students found that a small number of respondents consume alcoholic energy drinks because they are indistinguishable from regular energy drinks and can be consumed clandestinely in public places where alcohol consumption is prohibited (Brache &amp; Stockwell, 2010).</p>
<p><b>Educational:</b> <i>Develop and implement a modern, proactive public education to discourage co-administration of alcohol and caffeine. Such a campaign should be based on best practices for messaging for health-related behaviour change (see Appendix II).</i></p>	<p>While short-term public and school-based education campaigns have not been shown to change behaviour in isolation, when well-designed, implemented over the longer term, and combined with policy and regulatory changes, they can contribute to successful behaviour change as they did in the cases of drinking and driving and smoking. Employing best practices for public messaging for health-related behaviour change (see Appendix II) can increase the effectiveness of public education/prevention campaigns.</p>	<p>Babor, et al., 2010: Chapter 11; Stead et al., 2009</p>

## 10. Conclusion

Available sales and survey data suggest that the co-administration of caffeine and alcohol is a common and growing practice in Canada, especially among youth and young adults. Available research also suggests that the combined use of energy drinks and alcohol increases risk of harms over and above that expected from alcohol use and energy drink consumption alone. This effect occurs likely through decreased perceptions of intoxication and increased alcohol consumption. Given that alcohol is already a leading cause of preventable death and disability among youth and young adults, a comprehensive and proactive suite of initiatives to discourage the co-administration of energy drinks and alcohol is urgently required to minimize health and safety harms. Following the success of campaigns such as those directed at drinking and driving and tobacco use, to be most effective, these efforts should be based around an overlapping and reinforcing mix of policy, regulatory and educational initiatives based on high-quality research and monitoring.

## References

- Agriculture and Agri-Foods Canada. (2008). Market brief: The Canadian energy drink market. Retrieved from [http://www.ats.agr.gc.ca/canada/4469\\_e.htm](http://www.ats.agr.gc.ca/canada/4469_e.htm).
- Arria, A., Caldeira, K., Kasperski, S., O'Grady, K., Vincent, K. B., Griffiths, R., & Wish, E. (2010). Increased alcohol consumption, nonmedical prescription drug use, and illicit drug use are associated with energy drink consumption among college students. *Journal of Addiction Medicine, 4*(2), 74–80.
- Arria, A., Caldeira, K., Kasperski, S., Vincent, K., Griffiths, R., & O'Grady, K. (2010). Energy drink consumption and increased risk for alcohol dependence. *Alcoholism: Clinical & Experimental Research, 35*(2), 1–11.
- Babor, T., Caetano, R., Casswell, S., Edwards, G., Giesbrecht, N., Graham, K., et al. (2010). *Alcohol: No ordinary commodity: Research and public policy* (2<sup>nd</sup> ed.). New York: Oxford University Press.
- BC Liquor Distribution Branch. (2009). Sales data for alcoholic energy drink Rockstar+vodka.
- Brache, K. (2009). Alcohol and cocaine simultaneous polysubstance use: A qualitative investigation (Masters thesis, University of Victoria). Retrieved from <http://hdl.handle.net/1828/1436>.
- Brache K., & Stockwell, T. (2011). Drinking patterns and risk behaviours associated with combined alcohol and energy drink consumption. *Addictive Behaviours, 36*(12), 1133–1140.
- Brache, K., & Stockwell, T. (2010). Unpublished survey data on alcohol and energy drink use among college students at a western Canadian university.
- Brache, K., & Stockwell, T. (2008). *Patterns, settings, and functions of simultaneous use of alcohol and psychostimulants: A literature review*. Paper presented at the 34<sup>th</sup> annual alcohol epidemiology symposium of the Kettil Bruun Society for Social and Epidemiological Research on Alcohol, Victoria, BC.
- Butt, P., Beirness, D., Gliksman, L., Paradis, C., & Stockwell, T. (2010). *Alcohol and health in Canada: A summary of evidence and guidelines for low-risk drinking*. Ottawa, ON: Canadian Centre on Substance Abuse.

- Carson, K., Brinn, M., Labiszewski, N., Esterman, A., Chang, A., & Smith, B. (2011). Community interventions for preventing smoking in young people. *Cochrane Database of Systematic Reviews*, article no. CD00 1291. Retrieved from <http://summaries.cochrane.org/CD001291/can-community-interventions-deter-young-people-from-starting-to-smoke>.
- Cherpitel, C. (1999). Substance use, injury, and risk-taking dispositions in the general population. *Alcoholism: Clinical & Experimental Research*, 23(1), 121–126.
- Curry, K., & Stasio, M. (2009). The effects of energy drinks alone and with alcohol on neuropsychological functioning. *Human Psychopharmacology*, 24(6), 473–481.
- Dunlap, L. (2008). Wake up to the facts: Energy drinks & alcohol don't mix. *Journal of the Air Mobility Command*, 17(2), 20–21.
- Éduc'alcool. (n.d.). Energy drinks and alcohol: Don't get your kicks from this mix! Retrieved from <http://educalcool.qc.ca/en/alcohol-and-you/social-life/alcohol-and-energy-drinks-dont-get-your-kicks-from-this-mix>.
- European Commission. (2010). Standing Committee on the Food Chain and Animal Health Section on General Food Law: Summary of record of meeting of April 26, 2010. Retrieved from [http://ec.europa.eu/food/committees/regulatory/scfcah/general\\_food/sum\\_26042010\\_en.pdf](http://ec.europa.eu/food/committees/regulatory/scfcah/general_food/sum_26042010_en.pdf).
- Ferreira, S., de Mello, M., Pompeia, S., & de Souza-Formigoni, M. (2006). Effects of energy drink ingestion on alcohol intoxication. *Alcoholism: Clinical & Experimental Research*, 30(4), 598–605.
- Ferreira, S., Quadros, I., Trindade, A., Takahashi, S., Koyama, R., & Souza-Formigoni, M. (2004). Can energy drinks reduce the depressor effect of ethanol? An experimental study in mice. *Physiology & Behaviour*, 82(5), 841–847.
- Ferreira, S., de Mello, M., Rossi, M., & Souza-Formigoni, M. (2004). Does an energy drink modify the effects of alcohol in a maximal effort test? *Alcoholism: Clinical & Experimental Research*, 28(9), 1408–1412.
- Finnegan, D. (2003). The health effects of stimulant drinks. *Nutrition Bulletin*, 28(2), 147–155.
- Fitzpatrick, M. (2011). Energy drink labels to contain warnings. *CBC News*. Retrieved from <http://www.cbc.ca/news/politics/story/2011/10/06/pol-energy-drink-rules.html>.

- Health Canada (2012). Summary of comments on Health Canada's proposed approach to managing caffeinated energy drinks. Retrieved from <http://www.hc-sc.gc.ca/fn-an/legislation/pol/sum-som-comment-caf-drink-boiss-eng.php>.
- Health Canada (2011). Health Canada's proposed approach to manage caffeinated energy drinks. Retrieved from <http://www.hc-sc.gc.ca/fn-an/legislation/pol/energy-drinks-boissons-energisantes-eng.php>.
- Health Canada. (2005). Safe use of energy drinks. Retrieved from [http://www.hc-sc.gc.ca/hl-vs/alt\\_formats/pacrb-dgapcr/pdf/iyh-vsv/prod/energy-energie-eng.pdf](http://www.hc-sc.gc.ca/hl-vs/alt_formats/pacrb-dgapcr/pdf/iyh-vsv/prod/energy-energie-eng.pdf).
- Howland, J., Rohsehnaw, D., Arnedt, J., Bliss, C., Hunk, K., Calise, T., Heern, T., Winter, M., Littlefield, C., & Gottlieb, D. (2010). The acute effects of caffeinated versus non-caffeinated alcoholic beverages on driving performance and attention/reaction time. *Addiction, 106*(2), 335–341.
- Howland, J., Rohsenow, D., Vehige Calise, T., MacKillop, J., & Metrik, J. (2011). Caffeinated alcoholic beverages: An emerging public health problem. *American Journal of Preventative Medicine, 40*(2), 268–271.
- Jones, S. (May 2011). *Australian adolescents talk about alcoholic energy drinks*. Research report presented at the Australian Drug Foundation's 6<sup>th</sup> International Conference on Drugs and Young People, Melbourne Australia. Retrieved from <http://www.adf.org.au/6dyp>.
- Jones, S., & Barrie, L. (2009). Alcohol-energy drinks: Engaging young consumers in co-creation of alcohol related harm. *ANZMAC 2009*. Retrieved from [http://uow.academia.edu/LanceBarrie/Papers/221182/Alcohol-Energy\\_Drinks\\_Engaging\\_Young\\_Consumers\\_In\\_Co-Creation\\_of\\_Alcohol-Related\\_Harm](http://uow.academia.edu/LanceBarrie/Papers/221182/Alcohol-Energy_Drinks_Engaging_Young_Consumers_In_Co-Creation_of_Alcohol-Related_Harm).
- Kunin, D., Gaskin, S., Rogan, F. Smith, B., & Amit, Z. (2000). Caffeine promotes ethanol drinking in rats: Examination using a limited-access free choice paradigm. *Alcohol, 21*(3), 271–277.
- Lea, S., Black, K., & Asbridge, M. (2009). An overview of injuries to adolescents and young adults related to substance use: Data from Canadian emergency departments. *Canadian Journal of Emergency Medicine, 11*(4), 330–336.
- Levy, G., & Tapsell, L. (2007). Shifts in purchasing patterns of non-alcoholic, water-based beverages in Australia, 1997–2006. *Nutrition & Dietetics, 64*(4), 268–279.
- Linowski, S., & DiFulvio G. (2011). Mobilizing for change: A case study of a campus and community coalition to reduce high-risk drinking. *Journal of Community Health*. doi:10.1007/s10900-011-9500-5.



- MacDonald, N., Stanbrook, M., & Hebert P. (2010) “Caffeinating” children and youth [editorial]. *Canadian Medical Association Journal*. Retrieved from [http://www.cmaj.ca/cgi/rapidpdf/cmaj.100953v2?ijkey=3fe25e8be5b5e33e94ed4ce5d25002c9c4f64394&keytype2=tf\\_ipsecsha](http://www.cmaj.ca/cgi/rapidpdf/cmaj.100953v2?ijkey=3fe25e8be5b5e33e94ed4ce5d25002c9c4f64394&keytype2=tf_ipsecsha).
- Malinauskas, B., Aeby, V. Overton, R., Carpenter-Aeby, T., & Barber-Heidal, K. (2007). A survey of energy drink consumption patterns among college students. *Nutrition Journal*, 6(35), 1–7.
- Marczinski, C., & Fillmore, M. (2006). Clubgoers and their trendy cocktails: Implications of mixing caffeine into alcohol on information processing and subjective reports of intoxication. *Experimental & Clinical Psychopharmacology*, 14(4), 450–458.
- Marczinski, C., & Fillmore, M. (2003). Dissociative antagonistic effects of caffeine on alcohol-induced impairment of behavioural control. *Experimental & Clinical Psychopharmacology*, 11(3), 228–236.
- McLeod, R., Stockwell, T., Rooney, R., Stevens, M., Phillips, M., & Jelinek, G. (2003). The influence of extrinsic and intrinsic factors on the probability of sustaining an injury. *Accident Analysis and Prevention*, 35(1), 71–80.
- Miller, K. (2008a). Wired: Energy drinks, jock identity, masculine norms, and risk taking. *Journal of American College Health*, 56(5), 481–489.
- Miller, K. (2008b). Energy drinks, race, and problem behaviours among college students. *Journal of Adolescent Health*, 43(5), 490–497.
- O’Brien, M., McCoy, T., Rhodes, S., Wagoner, A., & Wolfson, M. (2008) Caffeinated cocktails: Energy drink consumption, high-risk drinking, and alcohol-related consequences among college students. *Academic Emergency Medicine*, 15(5), 453–460.
- Oteri, A, Salvo, F., Caputi, A., & Calapi, G. (2007). Intake of energy drinks in association with alcoholic beverages in a cohort of students of the school of medicine of the University of Messina. *Alcoholism: Clinical & Experimental Research*, 31(10), 1677–1680.
- Price, R., Hilchey, C., Darredeau, C., Fulton, H., & Barrett, S. (2010). Brief communication: Energy drink co-administration is associated with increased reported alcohol ingestion. *Drug & Alcohol Review*, 29(3), 331–333.

- Ragsdale, F., Gronli, T., Batool, N., Haight, N., Mehaffey, A., McMahon, E., Nalli, T., Mannello, C., Sell, C., McCann, P., Kastello, G., Hooks, T., & Wilson, T. (2010). Effect of Red Bull energy drink on cardiovascular and renal function. *Amino Acids*, 38(4), 1193–1200.
- Reissig, C., Strain, E., & Griffiths, R. (2009). Caffeinated energy drinks: A growing problem. *Drug & Alcohol Dependence*, 99(1–3), 1–10.
- Rothman, K., & Greenland, S. (1998). *Modern epidemiology* (2<sup>nd</sup> ed.). Philadelphia: Lippincott-Raven Publishers.
- Seetharaman, D. (2009). FDA killing buzz on alcohol and energy drinks. *National Post*. Retrieved from <http://www.nationalpost.com/life/health/story.html?id=ac50aba2-6b6e-4135-a333-cf6ed75cfcfd>.
- Schmidt, S. (2010). Health Canada strikes an uneasy regulatory balance on alcoholic energy drinks. *Canwest News Service*. Retrieved from <http://www.canada.com/health/Health+Canada+strikes+uneasy+regulatory+balance+alcoholic+energy+drinks/3042092/story.html>.
- Simon, M., & Mosher, J. (2007). *Alcohol, energy drinks, and youth: A dangerous mix*. Retrieved from <https://www.marininstitute.org/site/images/stories/pdfs/energydrinkreport.pdf>.
- Stead, M., Gordon, R., Holme, I., Moodie, C., Hastings, G., & Angus, K. (2009). *Changing attitudes, knowledge and behaviour: A review of successful initiatives*. York, UK: Joseph Rowntree Foundation. Retrieved from <http://www.jrf.org.uk/sites/files/jrf/alcohol-attitudes-behaviour-full.pdf>.
- Steinke, L., Lanfear, D., Dhanapal, V., & Kalus, J. (2009). Effect of “energy drink” consumption on hemodynamic and electrocardiographic parameters in healthy young adults. *The Annals of Pharmacotherapy*, 43(4), 596–602.
- Substance Abuse and Mental Health Services Administration. (2011). *The DAWN report: Emergency department visits involving energy drinks*. Rockville, MD. Retrieved from [http://www.samhsa.gov/data/2k11/WEB\\_DAWN\\_089/WEB\\_DAWN\\_089\\_HTML.pdf](http://www.samhsa.gov/data/2k11/WEB_DAWN_089/WEB_DAWN_089_HTML.pdf).
- Sullivan, J. (2010). State expected to ban sales of caffeinated alcohol drinks. *The Seattle Times*. Retrieved from [http://seattletimes.nwsources.com/html/localnews/2013389609\\_drinkban10m.html](http://seattletimes.nwsources.com/html/localnews/2013389609_drinkban10m.html).
- Thombs, D., O’Mara, R., Tsukamoto, M., Rossheim, M., Weiler, R., Merves, M., & Goldberder, B. (2010). Event-level analyses of energy drink consumption and alcohol intoxication in bar patrons. *Addictive Behaviours*, 35(4), 325–330.

- Thorson, J.A., & Powell, F.C. (1987). Factor structure of a lethal behaviours scale. *Psychological Reports*, 61(1), 807–810.
- US Food and Drug Administration. (2010). FDA warning letters issued to four makers of caffeinated alcoholic beverages [news release]. Retrieved from <http://www.fda.gov/NewsEvents/Newsroom/PressAnnouncements/ucm234109.htm>.
- US Federal Trade Commission. (2010). FTC sends warning letters to marketers of caffeinated alcohol drinks [news release]. Retrieved from <http://www.ftc.gov/opa/2010/11/alcohol.shtm>.
- Weldy, D. (2010). Research letter: Risks of alcoholic energy drinks for youth. *Journal of the American Board of Family Medicine*, 24(4), 555–558.
- Wiklund, U., Karlsson, M., Ostrom, M., & Messner, T. (2009). Influence of energy drinks and alcohol on post-exercise heart rate recovery and heart rate variability. *Clinical Physiological & Functional Imaging*, 29(1), 74–80.
- Woolsey, C., & Kensinger, W. (2009) *Energy drinks: The new gateway drug*. Paper presented at the 2010 AAHPERD National Convention and Exposition, Indianapolis, IN. Retrieved from [http://aahperd.confex.com/aahperd/2010/preliminaryprogram/abstract\\_14631.htm](http://aahperd.confex.com/aahperd/2010/preliminaryprogram/abstract_14631.htm).

## Appendix I: Definition of Terms

**Caffeinated alcoholic beverage (CAB):** An alcoholic beverage that contains caffeine.

**Co-administration:** When two substances (e.g., alcohol and caffeine) are consumed at the same time.

**Energy drink (aka plain energy drink, non-alcoholic energy drink, regular energy drink):** A beverage that claims to provide a burst of energy and/or enhance alertness.

**Hand-mixed CAB:** A CAB where a non-alcoholic energy drink is hand-mixed with an alcoholic beverage by a consumer or bartender.

**New-generation CAB:** A sweet-tasting product containing large amounts of caffeine that mixes well into cocktails. Unlike the older generation of coffee-based liqueurs (e.g., Kahlua, Baileys), new-generation CABs contain higher amounts of caffeine per serving.

**Pre-mixed CAB:** A CAB where the manufacturer has already combined an energy drink with, or added significant amounts of caffeine to, an alcoholic beverage that is packaged and sold in one container.

## Appendix II: Best Practices for Messaging for Health-related Behaviour Change

- **Use tailored messaging:** Explicit target groups should be identified and messages should be tailored to their values, attitudes and needs. It is important to develop the capacity to see the problem from the perspective of multiple target groups.
- **Use multiple approaches:** Messaging should target multiple audiences, be delivered through multiple venues/mediums, and contain varied but reinforcing content.
- **Cultivate broad social responsibility:** Messaging should be developed in such a way as to indicate that the solution to the problem belongs to society as a whole rather than the relatively few that regularly engage in the behaviour. This gets away from the tendency to blame and externalize solutions.
- **Enhance social support:** Social support to help those who engage in the risky behaviour to act differently should be cultivated.
- **Avoid moralizing the behaviour:** The problem must be framed in a way that appeals to target audiences and that avoids moralizing the behaviour.
- **Use positive messages:** The use of humor, empathy and other positive messages often works better than fear-based messaging.
- **Branding works:** Branding, which has been successfully used in commercial advertising, is a powerful tool to enhance public messaging campaigns.
- **Proactively counter competing messages:** Competing messages and norms should be explicitly identified and countered. These can be explicit (e.g., tobacco companies espousing freedom and personal choice to help maintain cigarette sales) or passive from existing social norms (e.g., people driving rather than taking the bus or walking for short trips).
- **Planning is necessary:** Successful social marketing uses planning to define clear and measurable objectives; identify the people who need to or can facilitate change (targets); establish how their needs can be met with attractive ‘change offerings’; and recognize and either cooperate with or block the competition.

Source: Stead, Gordon, Holme, Moodie, Hastings & Angus, 2009. Retrieved from <http://www.jrf.org.uk/sites/files/jrf/alcohol-attitudes-behaviour-full.pdf>.







**Canadian Centre on Substance Abuse**  
... Working to reduce alcohol- and drug-related harms

**Centre canadien de lutte contre l'alcoolisme et les toxicomanies**  
... œuvrer à la réduction des méfaits liés à l'alcool et aux drogues

In partnership with



**University  
of Victoria**

Centre for Addictions  
Research of BC

[www.ccsa.ca](http://www.ccsa.ca) | [www.carbc.ca](http://www.carbc.ca)