Alcohol Mixed with Caffeinated Energy Drinks:

Consumption Patterns and Trends Among Canadian Youth & Young Adults

by

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Author's Declaration

I hereby declare that I am the sole author of this thesis. This is a true copy of the thesis, including any required final revisions, as accepted by my examiners.

I understand that my thesis may be made electronically available to the public.

Abstract

Use of caffeinated energy drinks (CEDs) and alcohol mixed with energy drinks (AmEDs) is a growing trend worldwide, and in Canada, youth and young adults are the biggest consumers. Health Canada has recently changed regulations for CEDs, mildly affecting AmEDs. There are growing concerns around AmED use, including adverse health effects, excessive caffeine and alcohol consumption, and risk behaviours. There is currently insufficient evidence around AmED use in Canada to adequately inform policy and support stricter regulations. The current study sought to examine AmED use among youth and young adults in Canada, including associations with socio-demographics and behavioural characteristics. Responses were collected from an online-survey for 1989 respondents in Canada between the ages of 12-24. AmED outcomes, including awareness, use, type of AmED, location of use, reasons for use and risk behaviour were examined with multivariate logistic regression models including covariates sex, age, ethnicity, BMI, province, sleep patterns, school grades, maternal education, spending money, sensation seeking and binge drinking. Approximately 25% of the total sample reported AmED use in their lifetimes, and 74% of users reporting use in the past 12 months. Ever having AmED was greater (at $p<0.05$) among older youth and young adults, those living in BC or AB, SK, MB, and who binge drink. Current AmED use was greater among non-'Whites', those who did not report sleep time, and who reported greater binge drinking. Binge drinking was associated with the majority of AmED outcomes examined, including ever use, current use, pre-mixed AmEDs, AmED served by a bartender, used for intoxication or energy, and AmED awareness. Consumption of AmEDs is common among youth and young adults, and strongly associated with age, binge drinking and location of residence.

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Cassondra Michelle McCrory
University of Waterloo
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Do not go where the path may lead, go instead where there is no path and leave a trail.
~ Ralph Waldo Emerson

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1.0 INTRODUCTION

1.1 Caffeinated Energy Drinks

A caffeinated energy drink (CED) is typically defined as a beverage containing high levels of caffeine and a combination of other ingredients that may provide added benefits and flavour. CEDS are relatively new products on the beverage market and appear to be gaining in popularity, especially among children, teens and young adults.(1,2)

1.1.1 Product Composition

The main ingredients found in most CEDs include caffeine, amino acids, B-complex vitamins (B2, B5, B6, B12), carbohydrates and herbal supplements and stimulants.(2–8) The caffeine content of energy drinks has been found to range from 50 mg to 505 mg per container, with a typical range of 70 to 80 mg per 8 oz./250 mL serving, which is approximately three times the caffeine concentration found in caffeinated pop.(5,9–12) Energy shots, another popular caffeinated product on the market, can contain close to five times the caffeine concentration found in pop.(9) Other caffeine-containing ingredients that may contribute to the total caffeine concentration in CEDs include guarana, kola nut, yerba mate and cocoa.(5,9,13) Common amino acids in CEDs are taurine and L-carnitine, though the rationale for their addition remains unclear.(2,3,5,8,9,13,14) Ginseng, yohimbine, green tea and Ginkgo biloba, with their purported enhancing effect on energy, metabolism, stamina and physical performance, are among the most common herbal supplements added to CEDs.(2,9) Also found in some CEDs are methylated xanthine, a synthetic stimulant, gluconolactone, inositol and a large number of B-vitamins including niacin, B6, pantothenic acid, pyridoxine, riboflavin, B12 and pantenol, the alcohol

analog of vitamin B5.(2,5,8) B-vitamins are water-soluble and act as co-enzymes in cell function, including that of the mitochondria and energy production, a key ingredient to help convert added sugar to energy.(11) B-vitamins are thus often added for their purported effects on general vitality and stimulation, both physical and psychological.(3,11) Sodium is also an ingredient found in most CEDs, as it is often an ingredient added to carbonated beverages. While most evidence on the contents of CEDs is from the US and other countries, the contents of Canadian products appears to be the same.(15)

The stated purpose of CEDs is to help maintain or provide added energy to the body in order to decrease physical and cognitive fatigue, achieved primarily through the main active ingredient, caffeine.(3) Though the effects of caffeine have been well studied, there are mixed findings on the effects of most other ingredients found in CEDs on physical and cognitive function.(6) Inositol, for example, has been suggested to have beneficial effects on mood and a potential treatment for depression, however this has not been shown consistently and a Cochrane review found evidence inconclusive.(5) Niacin plays a role in the metabolic pathway of energy production, but it is unclear if it truly provides added benefit as an ingredient in energy drinks, especially given the flushing and discomfort it can cause at levels above the tolerable upper intake level.(5) Taurine may help improve endurance, play a role in muscle contraction and manage or prevent some medical conditions, though evidence is sparse and insufficient to make conclusions on many of the purported benefits of taurine.(5,6) Ginseng has been suggested to improve physical performance and it has been claimed that Ginkgo biloba enhances cognitive function, though the overall body of literature is not supportive of either claim.(5) The benefits of the ‘stimulants’ added to energy drinks remain primarily unproven; moreover, the ways in

which they interact with each other, other constituents in CEDs, and especially with caffeine is not well understood.

It is unclear what quantity of the ingredients in CEDs are naturally occurring or added, though it would appear most is the result of fortification.(3) The amount of added ingredient is often in excess of what is typically recommended for proper body function, and as a result, may have important side-effects, especially where an individual is not at any deficiency for the vitamin or mineral.(3,5,11) Amongst the most popular CEDs, *Red Bull, Rockstar, Monster* and *Full Throttle*, common B-vitamins including pyridoxine, cyanocobalamin (B12) and riboflavin (B2) have been added in amounts ranging from 100% to 500% of the Recommended Dietary Allowances (RDA).(11)

1.1.2 Caffeinated Energy Drink History

As a result of growing demand in the 1960s for products providing increased energy, CEDs were introduced to the market, first in Asia and then in Europe.(16) One of the very first companies to launch a product resembling what we now call an 'energy drink' was Taisho Pharmaceuticals in 1962, with their product *Lipovitan D*.(3,17) New products were developed and appeared on the market over the following decades, but the CED market truly began its exponential growth subsequent to the launch of *Red Bull* in Austria in 1987.(11,16,18) It took five years to obtain permission to introduce *Red Bull* in Germany and another nine thereafter to introduce it in the North American market in 2001.(18,19) Today, beverage and food companies manufacture CEDs, as well as pharmaceutical companies including Novartis and NVE Pharmaceuticals. Since

the introduction of CEDs to the marketplace, their market share has continued to grow compared to other beverages, as described in section 1.1.4.

1.1.3 Marketing of Caffeinated Energy Drinks

Popular marketing claims for CEDs include 'energy enhancing', 'decreases fatigue' and 'improves concentration and mental alertness'.(2,20) Though the original product was developed to respond to a need in the adult market, CEDs have since evolved into a multi-billion dollar industry that may be primarily targeted at youth and young adults, and in particular to groups that often require heightened awareness, such as athletes, students and those in professions demanding sustained alertness.(10,13,21) Increased CED consumption and market growth has been achieved largely via innovative and targeted marketing strategies at youth and young adults.(13,22,23) As *Red Bull* struggled to gain access to the German market, it wasn't long before the product became known as 'speed in a can', 'liquid cocaine', and a 'legal drug', driving its popularity among young adults.(18) There are a number of avenues to CED marketing: *Monster Energy* 'bought' a Canadian mountain by signing an agreement with Whistler Blackcomb to be the locations official energy drink.(24) Sponsoring

Figure 1. CEDs Sponsoring Ultimate Fighting Championship (UFC)

athletes and sporting events, promoting CEDs in association with alcohol and partying, and product placement in media such as video games and in social media such as Facebook, Twitter and Instagram are all marketing strategies geared at youth and young adults.(2,9) Sugary drink and CED brands had 31% of all display adds on YouTube and Facebook in 2013; *5-hour Energy* promoted its product on these sites more than all other beverages with 55 million advertisements compared to *Coca-Cola*, the second highest, at 31 million ads.(25) *Red Bull* however is the leader in social media marketing overall; *Red Bull* increased its advertising spending by 84% to $47.8 million between 2011 and 2013. *NOS (Coca-Cola)* CED increased its advertising by 152%, to $4.6 million.(25) Overall, advertising costs for sugar-sweetened beverages (SSBs) and CEDs amounted to $866 million in 2013.(25) Advertising expenditures are a reflection of the commitment of CED companies to target specific groups of potential users.

Many products are specially designed to target a specific group of individuals, such as *Club Energy Drink* geared at club-goers.(26) *Beaver Buzz* is a CED geared at the Canadian market, stating it is "Canada's energy drink."(27) Marketing initiatives also appear to be targeting young males more aggressively than young females, in particular for psychoactive, performance enhancing and stimulant drug effects.(2,16) Two-thirds of television advertisement for soft drinks and CEDs included sponsorship of an athlete, sports league, team, event or cause.(25) *Monster Energy's* YouTube videos featured Adam Kun, a BMX flatland world champion, while *Red Bull*'s covered both extreme sport events and Felix Baumgartner's parachute descent from 128,100 feet.(25) *Red Bull*'s YouTube video of Felix Baumgartner earned over 35 million views.(25) CED companies are also marketing to women via the creation of 'skinny' products; in 2013, 58% of energy drinks contained zero-calorie sweeteners.(25)

Though companies claim not to market CEDs to youth, marketing strategies and product design appear to indicate otherwise as reflected in American sales, where half of the CED market is made up of youth and young adults under the age of 25.(7,9,28) Of SSBs and CED products examined in the 2013 Rudd Center marketing study in the US, none was advertised more to children and teens than *5-hour Energy*.(25) Of all SSB ads, CEDs made up 15% of beverage ads viewed by children and 23% of ads viewed by teens; *Red Bull* ads were even viewed by preschoolers.(25) As described below, marketing to youth may be attributable in part to important regulatory oversight.(16)

1.1.4 Caffeinated Energy Drink Market Share and Sales

Marketing strategies appear to be effective, as reflected by US beverage sales between 1999 and 2008, which saw some popular beverage sales decline as energy drink consumption tripled, and sales of CEDs surpassed that of sports or fruit drinks.(29) Between 2010 and 2013, the volume of CEDs sold in the US increased by 41%, the highest growth among all beverages.(25) Similar trends may also be seen in Canada, especially given the increasing number of CEDs available in Canadian retail.(4) Agriculture and AgriFood Canada found that

Figure 2. CEDs Sponsoring Quagmire, from the Popular Animated Television Series *Family Guy,* and Characters from *Mario Bros.*

CEDs are the fastest growing market segment in the beverage industry since bottled water.(3) It was estimated by Agriculture and AgriFood Canada in 2010 that CEDs comprised 28% of the sales of fortified and functional beverage products, surpassed only by sports drinks with 29% market share.(30) In 2011, the Canadian CED market was valued at $318 million, and is forecasted to reach $404.8 million by 2015.(30)

Market growth is not just a North American phenomenon; there are currently CEDs selling in over 140 countries with hundreds of different brands available.(5) In 2006 alone, over 500 new CEDs were launched worldwide.(16) The multi-million dollar CED industry in New Zealand and Australia makes up 20% of the convenience store beverage market.(21) In France, CEDs dominated the functional beverage market with a 26% growth rate between 2008 and 2009.(31) In Sweden, the functional beverage market (foods enhanced with bioactive ingredients, significant fortification or enhancement with bioactive components and which have demonstrated health benefits), which encompasses CEDs, is the fastest growing segment in all of Europe.(32,33)

1.1.5 Caffeinated Energy Drink Regulations

CED Regulations Internationally

Caffeinated energy drink labelling is unstandardized and varies widely between countries, with many countries having no CED labelling regulations whatsoever.(2,11) Even in the US, where CEDs are classified as dietary supplements, the resulting labeling is quite lax.(11) Though the FDA limits caffeine in beverages to 71 mg per 12 fl. oz., this regulation applies to products classified as food and beverages, and does not apply to CEDs as natural dietary

supplements.(2,9) Inconsistent product classification results in confusion to the consumer, with identical products marketed, regulated and labelled as either of natural dietary supplements or conventional beverage.(2) In a survey of young adults, the majority of individuals could not correctly define components of an energy drink, differentiate between energy drink and sports drink, or identify potentially hazardous side effects of energy drinks.(10)

Other countries have also struggled with regulations around CEDs. In Denmark, concerns over high caffeine content and lack of information on taurine consumption resulted in a ban on the sale of *Red Bull* until 2009.(34) In 2001, the Danish Ministry of Food, Agriculture and Fisheries increased regulation around caffeine-containing products, and required the following warning: 'High caffeine content. Not recommended for children, pregnant women, and breast-feeding women.' The same warning will be implemented EU wide by December 2014.(34,35) After much debate over the product, France has classified energy drinks as 'fortified foods' due to the numerous added substances to the beverage, requiring them to meet the specifications and comply with European regulations on the addition of vitamins, minerals and certain other substances to food.(12) Regulatory changes in France come with much anticipation, especially after the sale of CEDs was banned for an extended period, before being reapproved for sale in 2008 due to insufficient evidence supporting the dangers of CEDs.(12) As a response to the French ANSES report highlighted previously, the Union of European Beverages Associations (UEBA) developed a Voluntary Code on the Labelling and Marketing of Energy Drinks that is said to outline "clear recommendations in relation to the key points raised".(36) Labelling and marketing in the European Union remains self-regulated and only among CED companies that are members of the UEBA.(36) France has also attempted to instate a one euro tax on all CEDs,

but the French Constitutional Council has since warned to French government to eliminate or modify the fee by January 2015.(37) In 2008, in Germany, Hong Kong and Taiwan, 0.13 μg of cocaine per can were detected in *Red Bull*, leading 11 of 16 German states to ban the sale of the product.(9) This may have been the result of trace amounts of cocaine remaining after extraction of flavouring from the cola leaf, in a dosage which would not cause harm.(9,38) In Sweden, sales of CEDs to children under the age of 15 are banned and in Norway the product may only be purchased in pharmacies.(9)

In Mexico, one of the countries with the strictest regulations on CEDs, a 25% tax has been imposed on CEDs since 2011.(39) The same year, the Mexican Senate prohibited the sales of CEDs to minors and passed a regulation requiring CED labels to include a warning against the risk of excess consumption of the beverage.(39) Stricter regulation exists in Turkey and Uruguay where the sale of CEDs is banned, and in Australia where CEDs in excess of 320 mg of caffeine per litre are also banned.(9) In Estonia, there have been CED specific guidelines implemented by the Consumer Protection Board to protect children from advertising and sale of these beverages.(40)

More recently, in September 2014, the Law on Circulation of Energy Drinks was approved by Latvian Saeima (parliament), prohibiting the sale of CEDs or promotional give-aways of CEDs to individuals under the age of 18 and requiring all retailers to request legal documentation for proof of age.(41) In addition, the new Latvian law also prohibits the sale of CEDs near educational institutions, requires CEDs to be on separate shelves from other food products and to display information on high caffeine concentration in CEDs and the potential negative impacts of

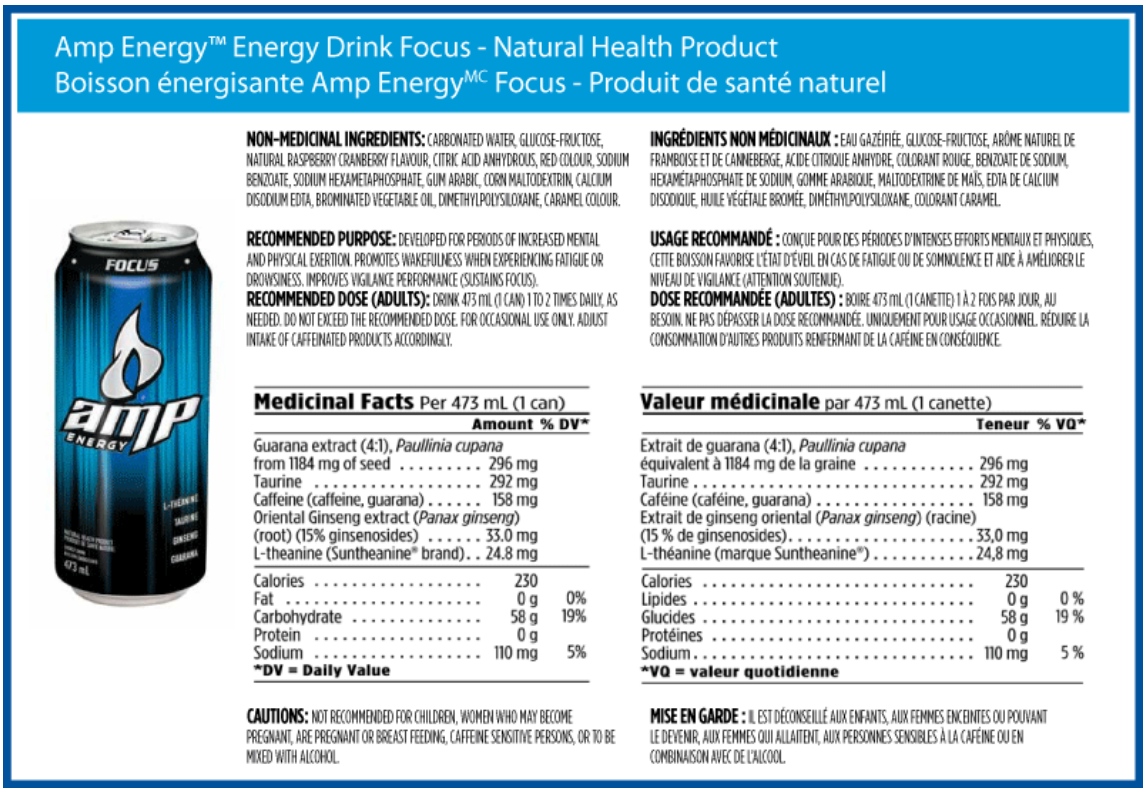
the beverage for pregnant women.(41) As of December 2014, high caffeine drinks (>150 mg/L) and foods in the United Kingdom will require the statement 'high caffeine content' on the label in the same area as the product name as well as the amount of caffeine per 100 ml.(35) The British Soft Drinks Association also provides a voluntary Code of Practice recommending appropriate warning labels on CEDs, such as 'Not suitable for children, pregnant women and persons sensitive to caffeine', and not to market the product to youth under age sixteen.(35)

Most countries, however, still do not have restrictions or regulation on the sale of CEDs, and many struggle to have CED regulations passed in a court of law.(9) Even at the US state level, CED regulation has been a struggle; bills to ban the sale of CEDs to minors have failed in Kentucky, Maine and Michigan.(9) It is unclear why the CED bills failed to pass in the US, and if it was a result of powerful lobbying and influence of the beverage industry. Yet it appears that people are in support of better regulation around CEDs. In a large survey of parents in the US, 67% indicate that they are concerned about caffeine content of beverages, 85% believe caffeine content and warning labels should be on CEDs, 78% oppose the marketing of CEDs to children and 74% agree these should not be sold to youth.(42)

CED Regulations in Canada

In Canada, CEDs were classified as Natural Health Products until December 2013.(4) As a Natural Health Product, CED containers included information on recommended use or purpose, recommended dose, cautionary statements, medicinal ingredients, including caffeine content, and non-medical ingredients.

Figure 3. Canadian CED Label for *AMP Focus* as Natural Health Product



Amp Energy™ Energy Drink Focus - Natural Health Product
Boisson énergisante Amp Energy^MC Focus - Produit de santé naturel

NON-MEDICINAL INGREDIENTS: CARBONATED WATER, GLUCOSE-FRUCTOSE, NATURAL RASPBERRY CRANBERRY FLAVOUR, CITRIC ACID ANHYDROUS, RED COLOUR, SODIUM BENZOATE, SODIUM HEXAMETAPHOSPHATE, GUM ARABIC, CORN MALTODEXTRIN, CALCIUM DISODIUM EDTA, BROMINATED VEGETABLE OIL, DIMETHYLPOLYSILOXANE, CARAMEL COLOUR.

RECOMMENDED PURPOSE: DEVELOPED FOR PERIODS OF INCREASED MENTAL AND PHYSICAL EXERTION. PROMOTES WAKEFULNESS WHEN EXPERIENCING FATIGUE OR DROWSINESS. IMPROVES VIGILANCE PERFORMANCE (SUSTAINS FOCUS).
RECOMMENDED DOSE (ADULTS): DRINK 473 mL (1 CAN) 1 TO 2 TIMES DAILY, AS NEEDED. DO NOT EXCEED THE RECOMMENDED DOSE. FOR OCCASIONAL USE ONLY. ADJUST INTAKE OF CAFFEINATED PRODUCTS ACCORDINGLY.

Medicinal Facts Per 473 mL (1 can)

	Amount	% DV*
Guarana extract (4:1), *Paullinia cupana* from 1184 mg of seed	296 mg	
Taurine	292 mg	
Caffeine (caffeine, guarana)	158 mg	
Oriental Ginseng extract (*Panax ginseng*) (root) (15% ginsenosides)	33.0 mg	
L-theanine (Suntheanine® brand)	24.8 mg	
Calories	230	
Fat	0 g	0%
Carbohydrate	58 g	19%
Protein	0 g	
Sodium	110 mg	5%

*DV = Daily Value

CAUTIONS: NOT RECOMMENDED FOR CHILDREN, WOMEN WHO MAY BECOME PREGNANT, ARE PREGNANT OR BREAST FEEDING, CAFFEINE SENSITIVE PERSONS, OR TO BE MIXED WITH ALCOHOL.

INGRÉDIENTS NON MÉDICINAUX : EAU GAZÉIFIÉE, GLUCOSE-FRUCTOSE, ARÔME NATUREL DE FRAMBOISE ET DE CANNEBERGE, ACIDE CITRIQUE ANHYDRE, COLORANT ROUGE, BENZOATE DE SODIUM, HEXAMÉTAPHOSPHATE DE SODIUM, GOMME ARABIQUE, MALTODEXTRINE DE MAÏS, EDTA DE CALCIUM DISODIQUE, HUILE VÉGÉTALE BROMÉE, DIMÉTHYLPOLYSILOXANE, COLORANT CARAMEL.

USAGE RECOMMANDÉ : CONÇUE POUR DES PÉRIODES D'INTENSES EFFORTS MENTAUX ET PHYSIQUES, CETTE BOISSON FAVORISE L'ÉTAT D'ÉVEIL EN CAS DE FATIGUE OU DE SOMNOLENCE ET AIDE À AMÉLIORER LE NIVEAU DE VIGILANCE (ATTENTION SOUTENUE).
DOSE RECOMMANDÉE (ADULTES) : BOIRE 473 mL (1 CANETTE) 1 À 2 FOIS PAR JOUR, AU BESOIN. NE PAS DÉPASSER LA DOSE RECOMMANDÉE. UNIQUEMENT POUR USAGE OCCASIONNEL. RÉDUIRE LA CONSOMMATION D'AUTRES PRODUITS RENFERMANT DE LA CAFÉINE EN CONSÉQUENCE.

Valeur médicinale par 473 mL (1 canette)

	Teneur	% VQ*
Extrait de guarana (4:1), *Paullinia cupana* équivalent à 1184 mg de la graine	296 mg	
Taurine	292 mg	
Caféine (caféine, guarana)	158 mg	
Extrait de ginseng oriental (*Panax ginseng*) (racine) (15 % de ginsenosides)	33,0 mg	
L-théanine (marque Suntheanine®)	24,8 mg	
Calories	230	
Lipides	0 g	0 %
Glucides	58 g	19 %
Protéines	0 g	
Sodium	110 mg	5 %

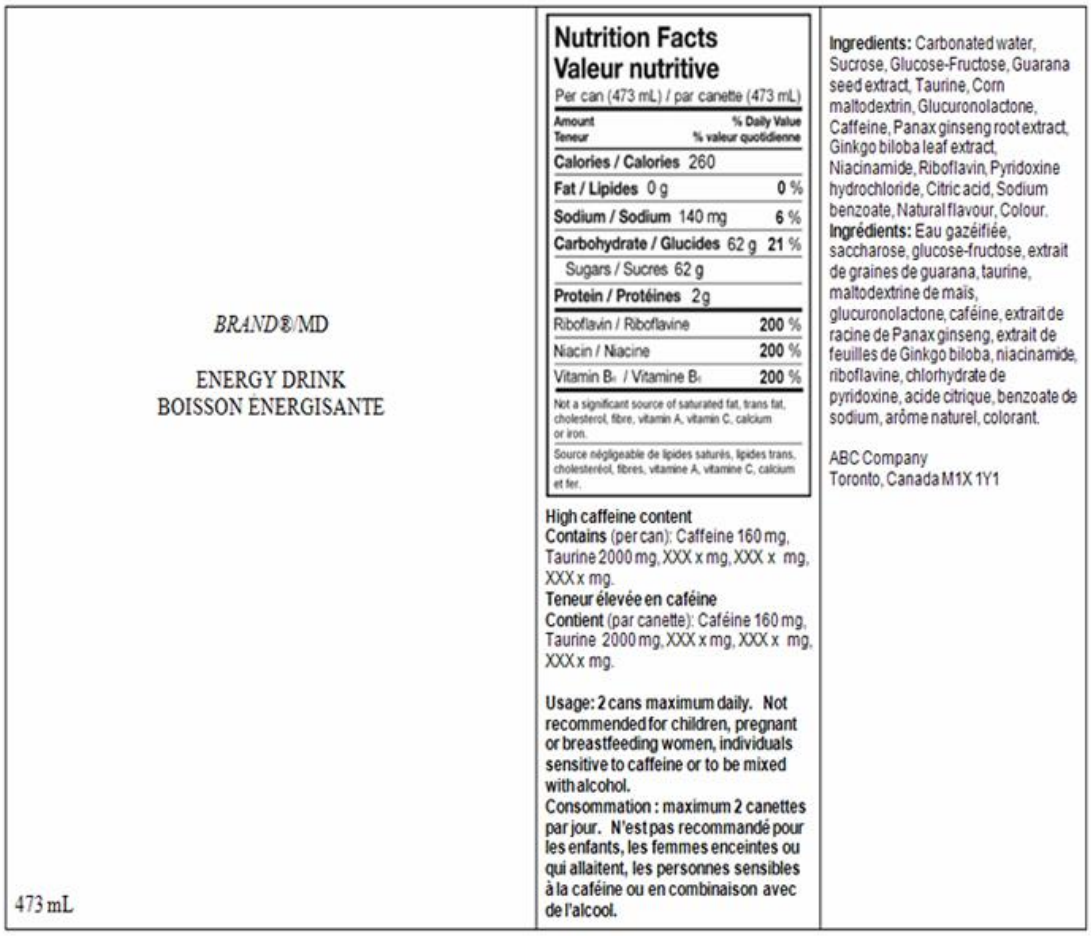
*VQ = valeur quotidienne

MISE EN GARDE : IL EST DÉCONSEILLÉ AUX ENFANTS, AUX FEMMES ENCEINTES OU POUVANT LE DEVENIR, AUX FEMMES QUI ALLAITENT, AUX PERSONNES SENSIBLES À LA CAFÉINE OU EN COMBINAISON AVEC DE L'ALCOOL.

Health Canada announced in October 2011 that CEDs would be classified under normal food and beverage regulations as it fits the regulatory definition of a food, resulting in the establishment of new requirements to improve safety around CED consumption, particularly among youth and young adults.(31) Companies selling CEDs in Canada had until December 2013 to comply with the new labelling requirements, allowing them to receive a Temporary Marketing Authorization (TMA) valid for five years.(4) This process allows Health Canada to continue to modify existing statements and implement additional requirements or restrictions on labelling to ensure it is effective.(4) Regulations of CEDs containing between 200 and 400 mg/L of caffeine in a typical beverage container include 1) limits on vitamin and mineral content levels, 2) standard nutrition labelling as required on other pre-packaged foods, 3) a maximum caffeine content of 180 mg per single-serve container, 4) total caffeine displayed in mg per container or per serving, 5)

prohibited use of CEDs as an ingredient in pre-mixed alcoholic beverages, and 6) required statements "not recommended for children, pregnant/breastfeeding women, individuals sensitive to caffeine", "High source of caffeine/High caffeine content", "Do not consume more than (X) container(s)/serving(s) daily" and "do not mix with alcohol".(4) Though CEDs are prohibited in pre-mixed alcoholic beverages, alcoholic beverages can contain caffeine so long as it is derived from naturally containing ingredient (e.g. guarana, yerba mate). Additionally, under the TMA letter, advertising and promoting of CEDs to children is prohibited, including the distribution of samples.(4)

Figure 4. Health Canada Caffeinated Energy Drink Sample Label



BRAND®/MD

ENERGY DRINK
BOISSON ÉNERGISANTE

473 mL

Nutrition Facts
Valeur nutritive
Per can (473 mL) / par canette (473 mL)

Amount / Teneur	% Daily Value / % valeur quotidienne
Calories / Calories 260	
Fat / Lipides 0 g	**0 %**
Sodium / Sodium 140 mg	**6 %**
Carbohydrate / Glucides 62 g	**21 %**
Sugars / Sucres 62 g	
Protein / Protéines 2g	
Riboflavin / Riboflavine	**200 %**
Niacin / Niacine	**200 %**
Vitamin B_6 / Vitamine B_6	**200 %**

Not a significant source of saturated fat, trans fat, cholesterol, fibre, vitamin A, vitamin C, calcium or iron.

Source négligeable de lipides saturés, lipides trans, cholestérol, fibres, vitamine A, vitamine C, calcium et fer.

High caffeine content
Contains (per can): Caffeine 160 mg, Taurine 2000 mg, XXX x mg, XXX x mg, XXX x mg.
Teneur élevée en caféine
Contient (par canette): Caféine 160 mg, Taurine 2000 mg, XXX x mg, XXX x mg, XXX x mg.

Usage: 2 cans maximum daily. Not recommended for children, pregnant or breastfeeding women, individuals sensitive to caffeine or to be mixed with alcohol.
Consommation : maximum 2 canettes par jour. N'est pas recommandé pour les enfants, les femmes enceintes ou qui allaitent, les personnes sensibles à la caféine ou en combinaison avec de l'alcool.

Ingredients: Carbonated water, Sucrose, Glucose-Fructose, Guarana seed extract, Taurine, Corn maltodextrin, Glucuronolactone, Caffeine, Panax ginseng root extract, Ginkgo biloba leaf extract, Niacinamide, Riboflavin, Pyridoxine hydrochloride, Citric acid, Sodium benzoate, Natural flavour, Colour.
Ingrédients: Eau gazéifiée, saccharose, glucose-fructose, extrait de graines de guarana, taurine, maltodextrine de maïs, glucuronolactone, caféine, extrait de racine de Panax ginseng, extrait de feuilles de Ginkgo biloba, niacinamide, riboflavine, chlorhydrate de pyridoxine, acide citrique, benzoate de sodium, arôme naturel, colorant.

ABC Company
Toronto, Canada M1X 1Y1

Beyond national product regulation, other levels of government are also implementing or discussing the implementation of additional regulations. In Ontario and New Brunswick regulations have been established that do not permit the sale of CEDs in schools.(43,44) In Quebec, many municipalities have taken action and banned CEDs in municipal buildings, high schools, Cegeps, arenas, sport infrastructures and community centers.(43,45) The Canadian Medical Association has argued for a ban on the sale of CEDs to minors, along with other provincial organizations such as Doctors Nova Scotia.(46) In September 2014, a Mi'kmaq reserve in Cape Breton banned the sale of CEDs, and a minimum age of purchase of 19 years was established at a near-by co-op.(47)

1.1.6 Prevalence of Caffeinated Energy Drinks

International CED Prevalence

CED consumption in the USA is prevalent, particularly among youth and young adults. CED consumption among youth is becoming an increasingly large contributor to children's daily caffeine intake.(48) Rates of CED consumption are a growing concern; the 2010 US National Youth Physical Activity and Nutrition Study found that 5% of students in grades nine to twelve drink a CED on a daily basis.(49) A nationally representative sample of 37,602 individuals surveyed between October 2010 and September 2011 found that the greatest proportion of CED use was in teenagers 13 to 17 years and young adults 18 to 24 years.(50) Moreover, CED consumption rates are becoming increasingly close between early and late teens; study findings from the 2009-2010 school-based survey Eating and Activity in Teens found 17% of boys and 13% of girls regularly consumed CEDs, and a nationally representative sample of students in

grades eight, ten and twelve during the 2010-2011 academic year found that 35%, 30% and 31% of students respectfully consumed CEDs or energy shots.(51,52)

CED use is currently highest among college and university aged young adults. Around 40% of undergraduate students report consuming at least one CED in the past month, though other surveys among this same population have reported rates as high as 51% for past month CED consumption.(28,53–56) In 2014, undergraduate students between the ages of 17 to 19 were surveyed, and again in year two and year three of their undergraduate degree. Results indicate that the overall sample prevalence of CED use increased by 62.5% between second and third year, with 23% using CEDs in second year and 37% using CEDs in the third year.(53) A 2005 survey of students aged 21 and over studying at a university in Argentina found that 40% of respondents had had six or more CEDs in the past month.(56) In a 2006 study by Malinauskas et al., of past month CED users, the majority typically drank multiple CEDs per week.(28) Another study from 2006, by Miller et al. found that among undergraduate students, almost 40% reported past month CED use.(54,55) Among US adults, rates are slightly lower, with around 31% of adults having consumed a CED at least once in their lifetime, and around 26% having consumed a CED in the previous year.(57)

In general, information on CED consumption outside North America is sparse, with the majority of consumption data coming from Europe. Consumption rates also vary widely among youth between countries, potentially as a result of highly varying regulations around CEDs.

In 1994 Germany examined consumption rates among youth shortly after the product entered the market. Among adolescents, 94% reported being aware of CEDs, 53% had tried them and 26% drank one CED per week.(58) Among the youngest population segment surveyed, 31% of girls and 50% of boys had already tried a CED between the ages of ten and thirteen.(58) More recent data from 2012 of CED consumption among sixteen European countries found that Germany had the highest overall prevalence of 'high consumption' (four to five times per week) of CEDs, at 19%, and the second highest prevalence among adolescents at 17%.(59) An Icelandic study, one of very few among children, surveyed 11,267 students in grade five to seven in 2013 and found CED consumption of one or more per day was 7% among boys and 3% among girls, and CED consumption of less than one per day was 12% among boys and 6% among girls. Thus, 19% of boys and 9% of girls consumed energy drinks before the age of 14.(60) Findings from a survey of Italian students during the 2011-2012 academic year, between the ages of eleven and thirteen, found that 'ever having tried' a CED increased with age, jumping from 18% among sixth graders to 56% among eighth graders.(61) More than 13% of eleven to thirteen year olds consumed CEDs once a month or more.(61) A 2012 European Union-wide study commissioned by the European Food Safety Authority (EFSA) to the Consortium Nomisma-Areté involved more than 52,000 participants, comprised of 14,000 adults, 32,000 adolescents and 5,500 children.(59) The highest prevalence of consumption was 68% among adolescents, followed by 30% among adults and 18% among children, with six to ten year olds being the highest consuming subgroup among children. Sixteen percent of children consumed CEDs four to five times per week. Between-country variation was also significant, with CED consumption among children at 6% in Hungary to 40% in Czech Republic. Some of the highest rates were observed in Greece, where 82% of adolescents (under the age of 18) report CED consumption.(59)

Differences across countries in CED consumption are somewhat less apparent among young adults. Published in 2007, results from a survey in Italy found 57% of university students used CEDs, 44% of 15 to 19 year olds surveyed in Trinidad and Tobago in 2011 used CEDs, and 52% of 16 to 19 year old females in the Kingdom of Saudi Arabia used CEDs according to research published in 2013.(62–64) Consumption of CEDs is also relatively frequent among Danish young adults between 16 to 24 years, 2010 data indicating 16% consume CEDs weekly; 12% consume CEDs one to two times per week and 4% consume CEDs three to four times per week or more.(34) Research published in 2011 by Attila et al. found that in Turkey, 48% of 4th year university students reported having tried a CED at least once in their lifetime, 90% indicated they had less than one CED per day, but 10% reported consuming one bottle per day or more.(10) A list of top seven highest per capita consumers of CEDs in 2007 included Thailand at the top of the list, along with the United States, Austria, Ireland, New Zealand, Slovenia, and Kuwait.(42)

Prevalence of CED use in Canada

The Canadian Alcohol and Drug Use Monitoring Survey, 2011, is the largest study providing data on CED consumption among Canadians to date.(65) However, it provides only a limited amount of information on CED and AmED consumption given the large scope of the study (which includes alcohol use, cannabis, drug use, harms, smoking, driving, and pregnancy) and includes respondents aged 15 and over.(65) Among respondents who drank alcohol in the past 30 days, close to 20% of respondents reported having an energy drink in the previous twelve months.(65) In addition, there are seven provinces that regularly conduct student drug use surveys, though only six include questions on CEDs; including the BC Adolescent Health Survey, the Manitoba Youth Health Survey, the Ontario Student Drug Use and Health Survey

(OSDUHS), and the Student Drug Use Survey in the Atlantic Provinces, which includes Nova Scotia, New Brunswick, and Newfoundland and Labrador.(66) The Québec Survey on Tobacco, Drug Use and Gambling in Secondary School Students does not include CED specific questions, however the Québec Health Survey of High School Students, conducted by the same organization does.(67)

The 2008 BC Adolescent Health Survey, the fourth conducted since 1992, is a representative survey of 29,000 BC youth in grades seven to twelve.(68) Results indicate that males, and youth who went to bed hungry are more likely to consume CEDs than females and those who were not hungry before going to bed.(68) Eight percent reported having a CED in the previous day, and 3% reported having two or more in the previous day.(68) The Manitoba Youth Health Survey included a question on CED consumption in the most recent 2012-2013 survey, however the findings have not been published at the time of writing.(69) Most recent data from the 2013 OSDUHS found that of 5,136 students in grades seven to twelve surveyed, close to 40% report past year CED use, with 12% reporting past week use.(70) Past year CED use increased significantly by grade, ranging from 26% in grade seven to 50% in grade twelve, and was more frequent among males than females.(70) CEDs were the most prevalent substance reported among grade seven and eight students, and second only to alcohol among grade nine to twelve students.(70) Overall, a near 10% decrease in prevalence of past year use was found between 2011 and 2013 surveys.(70) Though it cannot be determined with certainty, the decrease in prevalence may be explained by the implementation of the new school food and beverage policy in Ontario in 2010.(44) Of 8,210 students in grades seven, nine, ten and twelve who completed the 2012 Student Drug Use Survey in Atlantic Provinces (SDUSAP), close to two-thirds reported

CED consumption at least once in the previous year, and one fifth reported CED use of once per month or more.(71) CED consumption among New Brunswick youth, also based on the 2012 SDUSAP, was slightly lower with 57% who reported CED consumption at least once in the previous year, and 12% use of once per month or more.(72) Of all substances studied in The New Brunswick Student Drug Use Survey 2012 (NBSDUS), CED use surpassed all other substances in the survey, including alcohol.(72) The Québec Health Survey of High School Students 2010-2011 surveyed 63,196 high school students in grades seven to eleven and found almost 20% of youth consume CEDs two to three times a month or more, and 25% report rarely consuming them.(73)

Some additional small-sample university-based studies and a few large high school-based samples also provide added insight into CED consumption among Canadian youth and young adults. Among a random non-representative university based sample of 465 students from Western Canada, 23% reported consuming a CED with alcohol in the past 30 days, with no data on CED consumption alone.(22) The second university based sample was strictly among CED users from a Halifax university, which found that CED consumption occurred on an average of 7 days in the prior month.(74) In three regions of Quebec, surveyed in 2008, almost 12% of high school and college students reported consuming CEDs more than once a week, while just over half report occasional use of less than once a week.(75) Among adolescents in grades seven to eleven, 2010 survey data from 10,000 youth in Quebec revealed that 35% 'occasionally' consumed energy drinks, which included a range of responses from 'Rarely' to 'Every day or almost every day'.(76) Results from the 2009-2010 cross-sectional school-based survey, the School Health Action, Planning and Evaluation Surveys (SHAPES), of 13 to 18 year olds in

Ontario and PEI, found that more than 10% reported drinking 'high energy drinks' in the past 24 hours, which may indicate that daily CED consumption is increasing in Canada.(77) Also in Ontario, the 2012-2013 Compass study on health behaviours among students in grades 9-12, found that approximately 18% of students reported having consumed CEDs in an average week.(78) Though data are available on prevalence of youth consumption of CEDs, detailed information on patterns of use remains limited.

Table 1 in section *1.2.3 Prevalence of Alcohol Mixed with Energy Drinks* outlines the findings from Canadian studies described, including both CEDs and AmEDs. Most recent estimates of CED use among Canadian youth are between 40% and 62% for past year use and 12% to 18% for weekly use; these rates are higher than those reported for the adult population of 19% for past year use.(22,71,72,78,79)

1.1.7 Determinants of Caffeinated Energy Drink Consumption

Reasons for CED use

The most commonly reported reasons for CED use among regular CED users of college and university age are insufficient sleep, desire to increase energy or stimulation, for studying and working, for use in sports, for long car rides and in association with alcohol, such as to mix with alcohol, to be able to drink more alcohol or to treat a hangover.(10,28,56,80,81) One of the most common reasons for first time CED use among individuals who have 'ever' tried a CED is 'out of curiosity'.(10) Among females, commonly reported reasons for CED use are for vitality and to stay alert.(62)

A study in Ghana among student-athletes, found that the highest proportion of students reported the main reason for CED use as ‘to replenish lost energy after training or a competition’, followed by CED use ‘to provide hydration’, ‘to improve performance’ and ‘to reduce fatigue’.(82) Among both children and adolescents, CEDs’ main draw is the taste, along with added energy.(59) Adolescents also use CEDs to stay awake, improve sport performance and to treat a hangover.(59) Though cultural differences may exist, to our knowledge, there are no studies on differences in CED use across cultural groups. Many reasons for use overlap with many of the targeted market segments of CED companies, and thus it is hard to discern what proportion of use is attributable to the perceived need of the user, or the effect of successful marketing.

Socio-Demographic and Behavioural Correlates of CED Use

There appears to be a strong association between CED use and alcohol consumption.(10,12,34,53,55,61,71) CED users also appear to be more likely to use or have used drugs, and to smoke regularly.(34,53,55,59,61,71) Participation in sports activities and involvement in an athletic team is also associated with increased CED use among adolescents.(10,12,59,82) One survey found that among college athletes, a CED was the most frequently reported substance used to enhance athletic performance.(83) There also appears to be a positive association between CED consumption and masculinity, or a ‘jock identity’. A ‘jock identity’ has been associated with increased frequency of CED use.(54) In a survey of masculinity constructs among men, predictors of CED consumption were the endorsement of a traditional masculinity ideology, the masculine norms of risk-taking and the importance of work and leadership.(84) Among younger males, a risk-taking trait was also associated with frequency

of CED consumption, along with masculinity, and sport-related identity, all components of a so-called ‘jock identity’.(54)

With regards to socio-demographic characteristics among adults, CED users appear more likely to be male, non-Black minority, ‘younger’ (18–29 years old), have achieved high school or some college only, living in the city, employed, single, and to have children.(34,54,57,63) Current CED use correlates with CED use by a family member or close friend.(62) With regards to socio-demographic characteristics among youth in the USA, CED users appear more likely to be male, black or Hispanic, eat at fast-food restaurants and watch over three hours of television a day.(49,72) Among youth, CED consumption has been associated with higher video game use, intake of sugar-sweetened beverage and fruit juice as well as smoking or susceptibility to smoking.(10,52,85)

Certain personality traits have also been linked to CED consumption, mainly sensation-seeking and risk-taking.(54,71) The sensation-seeking personality trait may be at the root of the association between CED use and the increase in risk behaviour.(53) Among undergraduate students, CED consumption has been positively associated to sexual risk-taking, fighting, seatbelt omission, and taking risks on a dare.(55)

Perceptions of CEDs on Performance Outcomes

CED users and non-users alike appear to perceive CEDs as a product capable of providing increased energy and important improvements to cognition.(28,86,87) Adults have described CEDs as a product capable of providing benefits to both psychological and physiological

function.(86) Likewise, youth and young adults perceive CEDs as a tool to aid in the competition to achieve higher grades in school, to secure a place in university and to do better on exams, highlighting the perception of a performance enhancing product.(87)

1.1.8 Side Effects of Caffeinated Energy Drink Consumption

Caffeine

Health Canada is responsible for determining recommendations around dietary intakes. Based on extensive literature around caffeine, Health Canada has defined 400 mg/day as the upper limit for daily caffeine intake, for which risk is unlikely among the average adult, and 300 mg/day for pregnant and breastfeeding women.(5) For children and adolescents, the recommended maximum intakes are 45 mg/day for four to six year olds, 62.5 mg/day for seven to nine year olds, 85 mg/day for ten to twelve year olds and 2.5 mg per kg of body weight/day for teens.(5,88) Though Canada has defined guidelines around caffeine consumption, there is very little information available on caffeine intakes among either the Canadian or American populations.(50)

Caffeine is a stimulant widely known for its effects on alertness and its ability to help individuals stay awake and combat fatigue.(3,5,9) Though caffeine's stimulant effect is typically perceived as a positive side effect of its use, many undesirable side effects have also been associated with its use, particularly when consumed in excess.(16) Negative side effects include nervousness, anxiety, jitteriness, gastrointestinal upset, rapid heart rate and insomnia, with much graver side effects resulting when caffeine toxicity is reached.(9,16) The combined effect of caffeine toxicity and CED consumption is concerning. Toxic doses of caffeine can result in gastrointestinal upset,

vomiting, tremors, tachycardia, psychomotor agitation, hypokalemia, hallucinations, seizure, cerebral oedema and intracranial pressure, rhabdomyolysis (breakdown of muscle tissue damaging to the kidneys) and in rare cases, even death.(1,5,7,9,16) As an example, *Red Bull* contains 77 mg of caffeine in an 8 oz. serving, which would provide 2.2 mg/kg of caffeine for a 35 kg pre-teen, almost the maximum amount for a healthy pre-teen, without accounting for any other sources of caffeine in their diet.(9) As highlighted previously, CEDs in Canada can contain up to 180 mg per single-serve container, and up to 400 mg/L in a re-sealable container. Given the high amounts of caffeine present in some CEDs, and the evidence-based guidelines for caffeine consumption set by Health Canada, there are important concerns around labelling and consumption of CEDs, especially for youth.(31)

Caffeine Consumption and Sleep Disturbance

Concerns have also been raised that CED consumption may negatively affect sleep patterns among children and result in increased sleep disturbances.(9) It is important that children get adequate sleep for optimal function, and caffeine may have a negative effect on sleep time. A survey of six to ten year olds, completed by caregivers, found that children who had an average of 15 minutes less of nightly sleep time were more likely to consume caffeinated beverages, resulting in almost two hours less of sleep per week compared to children who do not drink caffeinated beverages.(89) In a large study of sleep patterns among children, of children who consumed caffeinated beverages, one in four girls and one in five boys reported having sleeping problems, compared to one in five girls and one in six males among children who did not consume caffeinated beverages.(60) The prevalence of physical complaints also increased with caffeinated beverage consumption among both boys and girls.(60) Decreased sleep time and

sleep quality in youth and young adults have been shown to negatively impact mood, behaviour, ability to learn and academic achievement.(90–92)

Caffeine Sensitivity

Sleep disturbance and negative side effects of caffeine can be heightened among individuals with sensitivity to caffeine. Caffeine sensitivity is not only common but also highly variable due to differences in genetic profile, physiological factors such as age, gender and pregnancy, typical caffeine consumption patterns, general health and presence of disease, and exposure to potentially interacting substances such as tobacco, alcohol and certain medications.(3,9,12)

Concerns related to CED consumption

There are many concerns around the consumption of CEDs. Some studies have demonstrated that CEDs may alter cognitive processing. CEDs have been show to alter one's ability and speed in decision making, resulting in confusion and uncertainty.(87) Among children, caffeine appeared to decrease speed of reaction time with incremental increases in caffeine.(9) CEDs may also have a diuretic effect, due to the elevated levels of caffeine.(11,93)

As mentioned previously, some negative side effects of CED consumption are cardiovascular related, such as tachycardia through association with caffeine toxicity.(1) Some studies have attempted to illustrate or explain the nuances in CED consumption and the cardiovascular system. One such study showed that CED consumption among healthy subjects resulted in increased heart rate of five to seven beats per minutes, and increased systolic blood pressure by ten mm Hg.(94) Elevated systolic blood pressure can result in systolic hypertension and

contribute to hypertension, which in turn may be damaging to the heart, the cerebrovascular system, and the kidneys.(95) CEDs may increase platelet aggregation and decrease endothelial function among healthy adults, resulting in increased mean arterial pressure.(96) It appears that CED consumption may result in potentially undesirable physiological effects, though it remains unclear if the temporary effects of CEDs also lead to long-term negative outcomes.

There has also been an increase in reporting of adverse events potentially due to, or related to, CEDs, and particularly among adolescents.(9,12,21,97) In Australia, 297 calls to the poison information center over a seven-year span were CED related, with an observed increase each year.(21) Cardiovascular-related events were among the most frequently reported symptoms.(21) In France, since 2008, after CEDs came to the market, 257 adverse events have been reported to ANSES, primarily cardiovascular in nature, including heart failure, feelings of tightness or pain in the chest, tachycardia and high blood pressure.(12) The second most reported type of adverse event was psycho-behavioural or neurological, such as irritability, nervousness, anxiety, panic attacks and epilepsy.(12) In the US, emergency department visits involving CEDs, half of which also involved alcohol consumption, have increased tenfold since 2009.(98) Germany, Ireland and New Zealand have also recorded an increasing number of CED related adverse events.(9)

Concerns among Youth

As the prevalence of CED consumption increases among youth, so do the concerns among this young and more vulnerable population, concerns also expressed by the Canadian Medical Association and the American Academy of Pediatrics.(20,99,100) One concern is around the potential association of CEDs to increased body mass index (BMI) and obesity. CEDs, unless

artificially sweetened, are often a SSB, and SSBs are the largest source of added sugar in the average diet and an important contributor to overall energy intake. CEDs are among SSBs with the highest median sugar content between 24 and 29 grams, equivalent to 7 teaspoons of added sugar; compared to flavoured waters, sports drinks and iced tea with 10 to 14 grams.(25) CEDs have been associated with greater SSB consumption among children, and may be a contributor to increased sugar intake.(49,52) Being overweight has also been associated with regular consumption of CEDs.(34) Sodium is also an added ingredient in CEDs, which may be of concern. In a study of SSBs, energy drinks were the highest in sodium, with approximately 113 mg per serving.(25) CEDs can contain anywhere from eight to over twenty percent of a young person's daily recommended sodium intake.(101)

Another concern for this population is the increased risk for serious adverse health events, heightened among children with cardiovascular, renal, or liver disease, seizures, diabetes, mood and behavioural disorders, hyperthyroidism or those who take certain medications.(9) Negative side effects more commonly experienced among youth as a result of CED consumption include increases in blood pressure and sleep disturbances, slowed reaction time, anxiety, insomnia, inattentiveness, irritability, headache, and palpitations.(9,72) Caffeine in CEDs also interferes with intestinal calcium absorption, detrimental during adolescence when maximal calcium deposition occurs for bone formation.(9) Unfortunately, it takes very little CED for these side effects to occur among children, where in most, as little as one drink can result in excess caffeine consumption for size.(5,9)

1.2 Alcohol Mixed with Energy Drinks

1.2.1 History of Alcohol Mixed with Energy Drinks

Alcohol mixed with energy drink (AmED) includes cocktails, such as vodka *Red Bull*, served at bars or self-mixed, premixed caffeinated alcoholic beverages, and alcohol and energy drinks consumed separately but within the same occasion, such as having a CED before going out with friends and having an alcoholic beverage an hour later.(13,102) Though AmEDs may have started as an original combination made in-house primarily by university and college students, entrepreneurs and beverage companies promptly seized an opportunity to develop a new product.(103) By 2005, new energy beers and malts could be found in the US market.(19) These newer pre-mixed beverages typically contain 6% to 9.9% alcohol by volume and 45 to 400 mg of caffeine per container, with *Rock Star 21* and *Joose* being popular examples.(19,103) It appears that AmEDs are now a normalized phenomenon, with well know forms such as *Red Bull* and vodka' and '*Jägerbomb*' that can be easily obtained and are increasingly consumed.(80,104)

1.2.2 Alcohol Mixed with Energy Drinks Regulations

Regulations around AmEDs are sparse and less defined than those of CEDs. A gap in AmED regulation may be a concern as pre-mixed AmEDs are being packaged and sold in similar formats to soft drinks and their non-alcoholic counterpart, CEDs, making it hard to distinguish between products.(9,105) In 2008, the efforts of policy makers resulted in two US national breweries removing caffeine from all their products, and in 2010 the FDA warned seven companies that they could no longer sell AmEDs.(13) Though the FDA banned pre-mixed AmEDs in 2010, they can still be obtained in bars and restaurants by mixing CEDs and alcohol together.(106) Subsequently, in 2012, several states prohibited the sale of *Four Loco* following

several incidences caused by the pre-mixed, high caffeine, high alcohol beverage.(13) The implication of federal regulations for CEDs, regulated by the FDA, do have a larger reach; however, state level regulations can typically be implemented more rapidly and may help fuel further federal regulations. The regulatory framework is similar to Canada's, where the same may be said of the difference between federal and provincial regulations on CEDs as described in sections 1.1.5 and 3.1. Europe's regulations around CEDs make no mention of alcohol.(35) There currently does not exist a mandatory or government established set of regulations to adequately manage the widespread use of AmEDs in Europe. In Australia, the state of Perth prohibited the sale of AmEDs in licensed venues after midnight in 2011, and in Newcastle, serving 'bomb' beverages (alcohol shots dropped into a CED) has not been allowed in bars or other late night venues since 2007.(104,107) Guidelines on Canadian regulations around AmED are outlined in section 1.3.

The US Centers for Disease Control and Prevention released a fact sheet of dangers related to AmEDs.(13) Other national organizations have also made statements highlighting the potential adverse effects of AmEDs and a growing body of literature suggests AmED consumption may be linked to a number of adverse health outcomes.(108)

1.2.3 Prevalence of Alcohol Mixed with Energy Drinks

International AmED Prevalence

AmEDs are following in the steps of CEDs, spreading across the globe with varying rates of consumption, from 57% lifetime use in Argentina to 20% past month use in Italy among young adults.(56,64) In the US, this trend is predominant among college and university students, also

showing a strong association between alcohol consumption and AmED consumption.(80,109) One US study reported 24% of students who had consumed alcohol had AmED within the preceding month.(80) Similarly, another study found 26% of students who drank alcohol had combined it with a CED in the past month.(54) Some university-based surveys have shown much higher rates of lifetime and past year AmED use, around 44% to 75% and 54% to 65%, respectively.(81,106,110) More alarming than the prevalence among young adults is the prevalence among youth, and somewhat surprising given the legal drinking age in the USA is 21. A survey of 13 to 20 year olds found that 17% of 13 to15 year-olds, 14.4% of 16–18 year-olds, and 24% of 19 to 20 year-olds who drank caffeinated beverages, reported consumption of AmEDs, energy shots or energy pills.(111) Volume of AmED consumption is also increasing; over 50% of college students who drink CEDs also combine three or more CEDs when drinking alcohol.(28)

Calls to the US National Poison Data Center are also evidence of AmED consumption on the rise, with a greater proportion of CED-related calls being cases of co-consumption with alcohol, predominantly among young adults.(109) There appears to be an incremental increase in past month alcohol use and past month AmED with each unit increase in CED consumption.(112) This relationship also appears to exist for individual drinking occasions, where alcohol and CED consumption are positively associated.(112)

In France, 16% of CED users, a quarter of whom are between the ages of 14 and 25, reported consumption of CEDs with alcohol.(12) On the higher end, 48.4% of university students who consumed CEDs (57% of the sample) surveyed in Italy, 40% of university students in Turkey,

and 52% of adolescents in Trinidad and Tobago, reported regular past month AmED use.(10,63,64) The previously highlighted European Union-wide study commissioned by EFSA, found rates of 56% and 53% for co-consumption with alcohol among adults and adolescents who drink CEDs respectively.(59) Among adolescents, 36% of the total population consumed AmEDs.(59) Findings from an Australian sample of CED users show most participants consumed three to five AmEDs in a standard night out, and a smaller number consumed as high as ten to fifteen.(104) More than half the sample also reported that their friends consumed AmEDs as well.(104)

Canadian Prevalence

Despite Health Canada's warning against the co-consumption of alcohol and CEDs, prevalence of AmED consumption in Canada is high. A summary on Canadian studies on CED and AmED consumption among youth is provided in Table 1. The CADUMS 2011 found that, among those who drank alcohol in the past 30 days, 31% have had an AmED in the past 12 months, and when asked about consumption of AmED in the past 30 days, prevalence only differed by 4%, with 27% reporting consumption.(65) The Youth Smoking Survey (YSS) 2010-11 was the first cycle of the YSS to ask about AmED, and it was reported that 21% of students in grades seven to twelve, or one in five students, reported AmED consumption in the past 12 months.(113) The 2012-13 YSS reported a prevalence of 24% of students who had a CED and alcohol on the same occasion in the past 12 months.(114) However, these findings cannot be directly compared as the questions were posed differently in the surveys.(114) The 2013 Ontario Student Drug Use and Health Survey (OSDUHS) was the first survey cycle to include a question on AmED consumption, and approximately half of the total sample was surveyed. Among students in

grades seven to twelve, 16% had mixed alcohol with an energy drink at least once in the past year, with a significant increase in consumption by grade increase, up to 28% in grade twelve, and males and females equally likely to drink AmED.(79) Similar prevalence of use was reported from the 2012-2013 Compass study among students in grades nine to twelve, with 17.3% reporting AmED use in the previous twelve months.(78)

Findings published by Price et al. in 2010 from a survey of 75 young adults at Dalhousie University in Halifax stated three quarters of respondents reported having tried AmEDs and close to a quarter reported drinking alcohol and a CED on the same occasion in their last use of CED.(74) Similar consumption rates were reported in a sample of 465 university students surveyed from the University of Victoria in 2010. Close to a quarter of those surveyed reported past month AmED use, with an average of twice monthly.(22,115) The New Brunswick Student Drug Use Survey Report examined alcohol consumption and CED use, but not co-consumption.(72) With few Canadian studies on AmED consumption, in particular among youth specifically, there is a lack of information on AmED consumption in Canada.

Recent estimates of AmED use among youth are between 16% and 24% for past year use, with reported use varying from 3% to 29% between grades seven and twelve.(67,71,79,114) Among young adult and adult in Canada, 31% report past year use.(65)

Table 1. Summary of Canadian CED and AmED studies

Author (date)	Survey*	CED	AmED	Location	Age (n)	Main Findings
Boak et al./CAMH (2013)	S.-R, P.-B. (OSDUHS 2013)	x	x	ON	Grade 7-12 (10,272)	- 40% reported past yr. CED use - 12% reported past week CED use - 16% reported past yr. AmED use (3% in gr.7 to 28% in gr. 12) (half of total respondents surveyed) - 1st substance in gr. 7-8, 2nd in gr. 9-12 - Equal AmED use males & females
Traoré et al. (2014)	S.-R, P.-B. (ETADJES 2013)		x	QC	Grade 7-11 (4,943)	- 20% reported past yr. AmED use - 10% reported AmED use in gr. 7, 29% in gr. 11
Hammond et al. (under review)	S.-R, P.-B. (Compass 2012-13)	x	x	ON	Grade 9-12 (23,631)	- 18% reported weekly CED use - CED use > younger students, males, Aboriginal, w/spending money higher BMI, greater alcohol use, trying to lose weight - 17% reported past yr. AmED use - AmED use > non-'White', w/ spending money, binge drinking
Health Canada (2014)	S.-R, P.-B. (YSS 2012-13)		x	Ca	Grade 6-12 (47,203)	- 24% reported CED and alcohol on same occasion in past 12 mo.
Gupta et al. (2013)	S.-R, P.-B. (NBSDUS 2012)	x		NB	Grade 7-12 (3,507)	- 57% reported CED use in the previous yr. - 12% reported CED use > once mo. - Males more likely to be frequent users than females
Azagba et al. (2014)	S.-R, P.-B. (ASDUS 2012)	x		NS NL NB	Grade 7, 9, 10, 12 (8210)	- 62% reported CED use ≥1 in previous yr. - 20% reported CED use ≥1/mo. - Sensation-seeking, depression, substance use >CED users, and > in frequency CED users

Author (date)	Survey*	CED	AmED	Location	Age (n)	Main Findings
Health Canada (2014)	S.-R, P.-B. (CADUMS 2011)	x	x	Ca	>15 (7,450 past 30 day alcohol users)	- 19% reported past yr. CED use - 31% reported past yr. AmED use - 37% of AmED users reported past 30 day AmED - 42% of AmED users had >1 AmED on same occasion
Health Canada (2012)	S.-R, P.-B. (YSS 2010-11)		x	Ca	Grade 6-12 (50,949)	- 21% reported past yr. AmED use
Azagba et al. (2014)	S.-R, P.-B. (YSS 2010-11)		x	Ca	Grade 9-12 (15,875 never-smoking)	- 13% reported past yr. AmED use - AmED ass. w/ susceptibility of smoking
Azagba et al. (2013)	S.-R, P.-B. (YSS 2010-11)		x	Ca	Grade 7-12 (36,155)	- 20% reported past yr. AmED use - AmED use > younger, non-'White' ethnicity - AmED use associated w/ smoking, heavy drinking, marijuana, weekly spending money, school absence, in school sports team
Pica et al./Institut de la statistique du Québec (2012)	S.-R, P.-B. (EQSJS 2010-11)	x		QC	13-16 (63,196)	- 17% consume CEDs ≥ 2x mo. - 25% reported rarely consuming CED - 43% reported having CED - 8% males, 5% females consume CEDs 1-6x week
Réseau du sport étudiant du Québec (2012)	S.-R, P.-B. (2010)	x		QC	Grade 7-9, age 13-17 (9,941)	- 35% reported CEDs use "Rarely" to "Every day or almost every day", including 7% use regularly - 60% think CEDs should be illegal for those <18 - 36% exclusively recognise the neg. effects of CEDs
Brache K, Stockwell T. (2011)	S.-R, online (2009-10)		x	BC	University students (465)	- 23% reported past 30 day AmED use - AmED users > likely to be heavier drinkers than non-AmED users - Greater AmED users had 2x odds of experiencing one or more neg. consequence related to use experiencing one or more neg.

Author (date)	Survey*	CED	AmED	Location	Age (n)	Main Findings
Vanderlee et al. (2014)	S.-R, P.-B. (SHAPES 2009-10)	x		ON PEI	13-18 (10,188)	- 10% reported drinking "high energy drinks" in the past 24 hours
Smith et al./ McCreary Centre Society (2009)	S.-R, P.-B. (BC Ado. Health Survey 2008)	x		BC	Grade 7-12 (29,000)	- 8% reported consuming 1 CED in the previous day, 3% report ≥2 - CED use > males & who went to bed hungry
Gaudreault et al. (2009)	S.-R, P.-B. & online (2008)	x		QC	Grade 7-11 & collegial (4,041)	- 12% high school students reported CED use > once a week - 64% high school students reported ever having CED
Price et al. (2010)	Structured face-to-face interviews (N.D.)	x	x	NS	University students 17–29 (75 past month CED users)	- CED use on average of 7 days in past 30 days - 76% mixed CED w/alcohol - 19% reported AmED in past week - Increased alcohol consumption w/CED than when consumed alone - 22% reported alcohol use with most recent CED use - 14% tried CED for 1st time while under influence of alcohol

*S.-R.: Self-reported, P.-B.: Paper-based

1.2.4 Determinants of Consumption of Alcohol Mixed with Energy Drink

Alcohol Mixed with Energy Drink Reasons for Use

The most commonly reported reason for mixing alcohol with energy drinks is in the context of partying or 'going out'.(28) More specifically, young adults frequently report 'increase energy', 'sociability', 'to increase intoxication', 'party longer', 'counteract the fatiguing effects of alcohol', 'stay awake' and 'alert to keep drinking' as primary reasons for AmED consumption.(6,81,104,105,116) AmEDs appear to be considered as a gateway to socializing and meeting people, through the combined effects of alcohol and CEDs.(6) One study reported

wakefulness as the main reason for AmED consumption, with many participants highlighting AmEDs' ability to make you feel less drunk by increasing alertness and energy, and the other half of participants highlighting AmEDs facilitating drunkenness by rapid consumption of CED shots and 'bombs' (such as *Jägerbombs*). These participants recognized the numerous negative side effects of AmED consumption, but felt that the benefits outweighed the harms, and the benefit of being able to stay out later, party longer and 'keep up' on weekends was worth the hangover and ill feelings post-heavy drinking and late nights.(104,105)

Socio-Demographic Correlates of Alcohol Mixed with Energy Drink Use

Many of the socio-demographic correlates of AmED consumption are similar to those of CED use. Like CED use, being male is a strong correlate of AmED consumption.(63,80,112,115) Younger adults are also more likely to consume AmEDs than other age groups, up to five times more likely.(57,115) Traits of the 'jock identity' also resonate with AmED consumption: younger white male university students, intramural athletes and members of a fraternity or sorority.(80) Other correlates of AmED consumption include playing a sport in school, being White, smoking and using marijuana, cocaine or ecstasy.(57,63,85,117,118) Consumption patterns around AmED indicates that AmED users, versus alcohol only users, were more likely to have had alcohol for the first time at a younger age, drink more alcohol and be hazardous drinkers, and encountered more negative alcohol-related experiences, including being taken advantage of sexually or taking advantage of someone sexually, riding with an intoxicated driver, intending to drive after drinking, being hurt or injured and requiring medical treatment.(57,80,115,116) Survey reports indicate that AmED users are more likely to engage in risky sexual behaviour such as unprotected sex, sex while under the influence of drugs, and sex after having too much to drink.(106,117) The correlation between risky sexual behaviour and

AmED use highlights specific populations that may be at greater risk of both consumption of AmED, and of greater adverse life events associated with AmED consumption. Other underlying disorders or key confounders may include depression, impulsivity and poor mental health, which have been associated with alcohol consumption, or AmED alone.(119–121)

1.2.5 Physiological Effects of Alcohol Mixed with Energy Drinks

AmED consumption has been associated with an increased risk, in some cases up to five times greater, for alcohol-related injuries and negative outcomes typically associated with alcohol consumption, and should be considered particularly concerning for youth.(5,13,111,112,118,122)

Effect of energy drink ingestion on alcohol intoxication

Numerous studies have shown that AmED decreases an individual's perception of their level of intoxication, though consuming AmED does not decrease actual impairment.(19,80,103) One study found that the urge to drink alcohol, based on the Alcohol Urge Questionnaire, was three-times greater in participants who had been given AmED compared to those who were given alcohol without an energy drink.(123) Consumption of AmEDs often results in increased alcohol consumption and intoxication, explained by a simple mechanism: AmED reduces perception of intoxication, mainly due to the effects of the caffeine component, secondly, reduced perception of intoxication results in greater alcohol consumption than one would potentially consume on a CED-free occasion, and impaired judgement results, potentially leading to risky behaviours.(13) There may be a quantitative association between AmED consumption and risk of experiencing alcohol-related consequences, where higher consumption of AmEDs leads to greater frequency of experiencing adverse events.(124)

Side Effects of AmED Consumption

A growing body of research highlights that AmED may pose a number of health-related concerns for children, adolescents and young adults in particular, the negative side effects of CEDs exacerbated by co-consumption with alcohol.(9,21,72,108) A number of studies have found that the likelihood of experiencing negative physiological and psychological side effects, and the degree to which they are experienced, is greater with AmED use compared to alcohol use alone.(8,108) Experiencing headache, weakness, dry mouth, and impairment of motor coordination was greater in instances of AmED consumption versus alcohol alone, but mental fatigue was lesser.(108,122) Other health related consequences associated with AmED consumption may include trouble sleeping, dehydration, increased heart rate and heart palpitations.(5,19,104,105,116) There is also some evidence to indicate that AmED consumption may result in a slower heart rate recovery and heart rate variability following exercise.(125)

No effects on experience or incidence of hangover have been found to date.(102) Consumption of CEDs with alcohol does not improve motor coordination or visual reaction time, nor does it have any effect on breath alcohol concentration.(7) There is evidence that alcohol can reduce cognitive and motor function, negatively affecting driving ability, and though users have reported drinking CEDs to be able to drive after drinking alcohol, the added caffeine or CED does not appear to decrease the effects of alcohol.(8,19,122,126–132) Some research has indicated that AmED consumption may mask some of the response impairment seen with alcohol consumption, but that AmED may not improve response inhibition and may worsen cognitive functioning; the effects of AmED on physical and cognitive impairment remains unclear.(13,127,132)

1.2.6 Behaviours Associated with Alcohol Mixed with Energy Drink Consumption

AmED and Alcohol Drinking Behaviour

High consumption of AmED has been associated with increased alcohol consumption and motivation to drink among adults, young adults and teenagers.(74,80,98,111,112,116,133) One study found a near two and a half-fold increase in likelihood of alcohol dependence compared to AmED non-users, and close to a two-fold increase compared to low frequency users.(133) A survey of 1,031 youth age 13-20 who consume alcohol found that AmED consumption was significantly associated with binge drinking, fighting and alcohol-related injuries.(111) Even though AmED consumers are aware of some of the consequences of AmED, the majority do not see this as a deterrent to limit or stop drinking AmEDs.(104,105)

AmED and Risk-Taking Behaviour

Young adults who consume AmED are four times more likely to intend on driving after drinking compared to individuals who consume alcohol alone.(116) Not surprising, AmED users are also more likely to ride with an intoxicated driver or have an alcohol-related motor vehicle accident.(5,80) AmED users appear to take part in a greater number of high-risk events compared to non-users.(13,134) What is not yet understood is if personality traits such as impulsivity, sensation-seeking, and risk-taking behaviour lead to AmED use, or if AmED use is primarily what leads to risk-taking behaviour.(13)

1.3 Caffeinated Alcoholic Beverages in Canada

Canadian Regulation and Market

As described in section 1.1.5 Caffeinated Energy Drink Labelling Regulations, Canada now has a number of regulations outlining the labelling, marketing and sale of CEDs. All CEDs must now follow the Food and Drugs Act and Food and Drug Regulations and the Consumer Packaging and Labelling Act and Regulations, which affects AmED regulation in Canada.(4) Health Canada has required the statement "Do not mix with alcohol" to appear on all CEDs sold in Canada under the food labelling provisions, either alone in bold text, or under a standardized bolded heading "Caution/Mise en garde" or "Caution/Attention".(4,31) Health Canada has also prohibited CEDs from containing alcohol, mandatory as of December 2013 in order to obtain a five-year Temporary Marketing Authorization (TMA).(4) However, even though CEDs are prohibited in pre-mixed alcoholic beverages, pre-mixed alcoholic beverages can still contain caffeine so long as the caffeine is derived from a naturally containing ingredient.(4) Examples of beverages that may be sold under these regulations, and can be found at most Canadian alcohol retail outlets such as the Liquor Control Board of Ontario, include *Rockstar Vodka*, *Rockstar SuperSours Vodka, Rev, Bacardi Oakheart & Cola* and *Jack Daniel's Cola*.(135) An additional concern regarding the pre-mixed caffeinated alcoholic beverages that made it through the regulatory 'loophole', is that classified as alcohol, they no longer need to follow any of the labelling requirements of CEDs. Alcohol labelling in Canada does not include any warning statements, nor regulations around caffeine content and disclosure.(136)

Some companies have also found ways around regulations restricting the sale of pre-mixed AmEDs via marketing strategies or other sources of communications, such as *Club-Mate* for

example.(137) *Club-Mate* is a popular German energy drink with Yerba mate tea extract and added caffeine that has recently become available in Ontario.(137) The Club-Mate website explicitly states that "It [Club-Mate] is mixed with vodka, rum, or *Jäger*, and helps you keep partying through the night."(137)

Though regulations do exist around the sale of pre-mixed alcohol and CEDs, regulations on the sale of alcohol and CEDs together are sparse in Canada. In 2011, Health Canada held stakeholder consultations where comments were received to gain insight on managing CEDs; one of the recommendations for point of sale was that these products not be made available in bars and other places where alcohol is sold. To our knowledge, no regulations have been implemented to limit the sale of CEDs in bars or nightclubs.(138) As part of Manitoba Liquor Control Commission's future steps for public safety, they have announced plans to conduct a study on the use of energy drinks mixed with alcohol.(139) Mid-August 2014, Toronto Public Health proposed a ban to the Toronto Board of Health on the sale of energy drinks alongside alcohol at events on city property.(140) Within less than two weeks, the Toronto Board of Health voted against the proposed regulation and requested Toronto Public Health have further consultation with stakeholders including the beverage industry before this proposal could be revisited.(141) To our knowledge, there are currently no regulations against the sale of CEDs and alcohol together at events on city properties or in bars, pubs, nightclubs or restaurants in Canada.

Companies have been encouraged to provide a toll-free number on CED packaging to improve the reporting of CED or AmED related incidents, as companies are now required to record and report consumption incidents to Health Canada on an annual basis.(4) Standardized industry

forms have been developed by Heath Canada to facilitate the reporting process.(4) These regulations come as an important improvement to Canadian beverage regulations at a time when AmED consumption continues to gain momentum and popularity in Canada, especially among youth and young adults.

2.0 RATIONALE

Overall, both CED and AmED use in Canada have increased. Studies suggest very high levels of AmED use among youth in particular, although there is little information on Canadian frequency of use and patterns of use in particular. Current evidence suggests that CEDs and AmEDs may put children and youth at risk for serious adverse health effects, and reports of adverse events appear to be increasing. In response to health concerns over CED composition and their popularity among children and youth, Health Canada has recently imposed new restrictions on CEDs.(4) Since December 2013, new policy measures are in effect and include limits on caffeine content and new labelling requirements.(4) Companies that met the new requirements received a five year TMA, during which time Health Canada will continue to review the evidence and consider additional regulatory requirements.(4)

Currently, there are very few data on the use of AmEDs among young Canadians, and no independent monitoring or data source in place to assess the effectiveness of the new CED measures. There is an urgent need for evidence to inform future policy measures, which could include restricting health claims, enforcing additional labelling requirements and strengthening regulation around the sale and use of AmEDs.

2.1 Research Questions

The primary objective of the current study was to examine AmED use among youth in Canada. This research project assessed AmED patterns of use and risk behaviour in a national online survey conducted with 2,000 youth aged 12 to 24.

The study addressed four specific research questions:

1. What is the prevalence of AmED consumption among Canadian youth and young adults?
2. What are the patterns of use among AmED users, including the types of AmED and locations of use?
3. For what reasons do Canadian youth consume AmEDs?
4. Do youth who consume AmEDs experience drinking-related harms, including an increased risk of driving under the influence or being in a vehicle with someone under the influence?

The hypotheses connected to these research questions are specified in section 4.1 *Hypotheses*.

3.0 METHODS

3.1 Study Protocol

The current study is a part of a larger CIHR-funded study on caffeinated energy drinks, conducted by a research team based at the University of Waterloo and led by Dr. David Hammond. Additional collaborators include Chantal Martineau from the Office of Nutrition Policy and Promotion, Health Canada, Dr. Dan Harrington from the University of Toronto and Dr. Pat Vanderkooy from the Dietitians of Canada. The primary objective of the larger study is to evaluate the effectiveness of the new CED policy measures implemented by Health Canada.

The data for the current study were collected through an online survey with a target of 2,000 respondents from all provinces and territories in Canada. The survey examined: 1) patterns of use, including current use, interest in trying, reasons and settings of use; 2) socio-demographic correlates of use, including age, gender, race, socio-economic status, sensation-seeking and risk behaviours, 3) drinking-related harms, specifically an increased risk of driving under the influence, or being in a vehicle with someone under the influence. Online surveys were conducted in French and English using a commercial panel. Léger Marketing, an online commercial panel that provides a national sample across a range of socio-demographic characteristics, was used for surveying. Léger Marketing contacted and invited participants to complete the survey, and offered a monetary or *Air Miles* incentive based on the length of survey. Upon survey completion, the chosen incentive was added to the participant's total funds accumulated with the firm and is awarded to them when a total of twenty dollars is reached.

3.2 Study Participants

Youth between the age of 12 and 24 were invited via email to complete the online survey. The target sample of two thousand participants was drawn from Léger Marketing's online panel of more than 300,000 active members.(142) The sample had fixed equal quotas of 1000 youth between the ages of 12 and 17, and 1000 between the ages of 18 and 24. Request was also made for additional targets of equal number of males and females, as well as proportional representation of participants from all Canadian provinces, and French and English speakers. Consent from a parent or legal guardian was required in order for minors to participate. Consent was obtained prior to starting the study.

Internet surveys currently provide equal or greater sample reach than telephone surveys particularly for surveys targeting young people.(143) Léger Marketing has recruited over half of its panel using probability-based sampling methods in order to provide a more representative sample, which applies both to adults (parents) and youth in this sample. Though this online panel is not a nationally representative sample, it is very diverse and resulted in participant recruitment from a broad range of socio-demographic characteristics. Léger Marketing's panel is comprised of approximately 32% of individuals with an education level of high school or less, and approximately 30% who report a household income of less than $40,000, providing a similar distribution to that observed through Statistics Canada.(144,145)

3.3 Measures

The CIHR-funded repeat cross-sectional study on caffeinated energy drinks included a survey section on caffeine intake as a complete 24-hour dietary recall of all potentially caffeine

containing items, on consumer perceptions of CEDs and on CED patterns of consumption. The following measures describe the survey components specific to the current study only, CED patterns of consumption, as it pertains to AmED use.

To develop a comprehensive survey that would also allow for comparability with findings stemming from other important surveys, a large number of questions were drawn from previously developed instruments. Questions were replicated, or adapted and modified when appropriate, from the Canadian Community Health Survey, the 2013 National Youth Risk Behaviour Survey, the Youth Smoking Survey 2013 module B, the Core Alcohol and Drug Survey 2004, the Gathering Consumption Data on Specific Consumer Groups of Energy Drinks questionnaire 2012, the Harvard College Alcohol Study Questionnaire Appendix B, the Alcohol and Energy Drinks survey 2010 by the Centre for Addictions Research of B.C., the Utrecht Student Survey 2011, and the Study to Prevent Alcohol-Related Consequences College Drinking Survey, many of which have been validated or are also based on previously validated questionnaires.

The survey tool was translated into French by a professional translator through Health Canada, and reviewed by a bilingual member of the research team. Wherever the English survey question used was from an already existing English survey with in French version, the French wording was used or slightly adapted for the current survey, such as Enquête sur le tabagisme chez les jeunes 2012-2013 - Module B. If a French version of the question did not already exist, to ensure adequate and comparable translation, questions were compared to Questionnaire de Réunir Réussir 2010, Fondation Canadienne Des Bourses d'études du Millénaire: Sondage Auprès des

Écoles Secondaires - Sondage Auprès des Élèves de la 6e à la 8e Année 2003 and Sondage mené auprès des élèves - Conseil scolaire Viamonde 7e et 8e année.

A copy of the final survey including all measures can be found in Appendix A. Surveying began on October 3rd 2014 and was completed October 22nd, with surveying done on all seven days of the week. The median survey length was 20 minutes per person.

3.3.1 Demographic Information

Socio-demographic and behavioural information collected includes gender, age, ethnicity, province of residence, BMI, indicators of health status (weight behaviour, health conditions, sleep time, sleep trouble, difficulty staying awake), school grades, parental education (maternal and paternal), spending money and sensation-seeking behaviour. All socio-demographic variables are categorical as described below, with the exception of sensation-seeking which is pseudo-continuous.

Gender and Ethnicity

Response options for *Gender* were female and male. There were a number of response options possible for *Ethnicity*, in addition to an open-ended response field. Given the wide range of response options and low frequencies for each, ethnicity was recoded to 'White' and 'Other'. 'White' includes Canadian, most European nationalities, and a number of other groups where most self-identify as 'White'. 'Other' includes all other non-'White' ethnicities (e.g. Metis, mixed, Spanish) and those missing a valid response.

Age

Acceptable *Age* responses included 12 to 24 years old. After observing the age distribution for key outcomes, age was recoded into 4 categories: 12 to 14 years, 15 to 17 years, 18 to 20 years and 21 to 24 years. Both legal ages of drinking in Canada, 18 and 19, were grouped together. An additional age-based category determined by legal drinking age (*Age legal*) was also created, and classified as underage for respondents <18 in AB, MB, QC, and <19 in BC, NB, NL, NS, NT, NU, ON, PE, SK, YT, and of legal drinking age for respondents ≥18 in AB, MB, QC, and ≥19 in BC, NB, NL, NS, NT, NU, ON, PE, SK, YT.

Province

All ten provinces and three territories were included in the survey as response options: Alberta (AB), British Columbia (BC), Manitoba (MB), New-Brunswick (NB), Newfoundland (NL), North West Territories (NT), Nova Scotia (NS), Nunavut (NU), Ontario (ON), Prince Edward Island (PE), Quebec (QC), Saskatchewan (SK) and Yukon (YT). Given the low sample sizes for some provinces, including the Maritimes and Territories, five regions were created. The first region is BC, second is AB, SK, MB, third is ON, fourth is QC and fifth is Maritimes and Territories.

BMI and Indicators of Health Status

BMI was calculated from self-reported height and weight and classified according to WHO guidelines adjusted for age and gender.(146,147) *BMI* was thus recoded to categories underweight, healthy weight, overweight, obese, and a 'not reported' category. *Weight*

behaviour, was categorized as lose weight, gain weight, stay the same weight, no current weight loss efforts and not reported.

Sleep

Three sleep-related questions were assessed. *Sleep time*, the time spent sleeping each day, was assessed by asking participants "How many hours do you usually spend sleeping in a 24 hour period, excluding time spent resting?", with an open ended response frame. *Sleep time* was categorized as ≤7 hours (insufficient), 8 hours (borderline), ≥9 hours (optimal), based on the National Sleep in America Poll 2014 classification and the guidelines provided by the Canadian Sleep Society for youth and teenagers.(148,149) Other sleep related questions included "How often do you have trouble going to sleep or staying asleep?" (*Sleep trouble*) and "How often do you find it difficult to stay awake during your normal waking hours when you want to?" (*Trouble staying awake*). There were five response options that were categorized to never/rarely, sometimes, most of/all of the time and 'not reported'. Given the high correlation between *Sleep time, Sleep trouble* and *Trouble staying awake*, and after examining correlation with key outcomes, only *Sleep time* and *Trouble staying awake* were retained as a covariate in further analyses.

Education

Information on the respondents' years of education (*Highest grade completed*) was recorded; however, it was not included in descriptive information for this sample or analyses given the age range of the sample and the high correlation of years of education with age. However, information on student success, based on average marks in school, was included. *School grades*

were categorized as < 59%, 60-69%, 70-79%, 80-89%, 90-100% and 'not reported'. Information on *Paternal* and *Maternal education* was gathered and categorized as high school or less (includes did not attend high school, attended high school, graduated high school), some additional training (includes attended college, graduated college), higher education (includes attended university, graduated university) and 'not reported'. A combined *Parental education* variable was also created. However, given the high correlation between the three variables, and after examining correlations with key outcomes, only *Maternal education* was retained for inclusion in models.

Spending Money

Weekly *spending money* was also included as a covariate. Categories for spending money were zero, $1 to $5, $6 to $10, $11 to $20, $21 to $40, $41 to $100, more than $100 and don't know/not reported. Responses were then grouped as zero, $1 to $20, $21 to $100, more than $100 and 'not reported'.

Sensation-seeking

Sensation-seeking was assessed by asking participants "Please tell me how much you agree or disagree with each of the following statements" for the following three items: "I like to do frightening things. Do you…", "I like new and exciting experiences, even if I have to break the rules. Do you…", "I prefer friends who are exciting and unpredictable. Do you…" Response options were 'Strongly disagree', 'Disagree', 'Neither disagree nor agree', 'Agree' and 'Strongly agree', with response values of zero through four respectively. All other responses were grouped with 'Neither disagree nor agree'. The sum of these three responses is the *sensation-seeking*

index, resulting in a pseudo-continuous variable with a range of zero through twelve, where zero is not sensation-seeking and twelve is very sensation-seeking in personality. The sensation-seeking questions were adapted from the Brief Sensation Seeking Scale.(150) An assessment of sensation-seeking personality is relevant as it may also be an indicator of likelihood to consume AmED, as prior research has shown sensation-seeking personalities tend to be associated with drug and alcohol use.(151)

3.3.2 Energy Drink Consumption

A total of forty-four specific questions were included in the survey to assess patterns of CED consumption. The statement "We would like to ask you some more questions about energy drinks. Popular brands include *Red Bull*, *Monster*, *Rockstar*, *NOS*, *Amp*, and *Full Throttle*, but there are others. DO NOT include sports drinks, such as *Gatorade* or *Powerade*." was included before participants were prompted to answer CED questions to help eliminate potential reporting error due to confusion about what qualifies an energy drink.

Participants were asked about ever use of CEDs (any, age), current use (most recent, lifetime quantity, frequency in past week, greatest number in one day (due to lasting effect of caffeine)), location(s) of consumption, susceptibility of trying (been offered, friend consumption, interest in trying, likeliness to accept), CED brands (awareness, trial, preference, selection factors), CED source (location), CED warning statements (awareness), side-effects experienced after CED consumption, CED reasons for use, perceptions around CEDs, including acceptability and awareness of educational campaigns, and CED marketing awareness. CED non-users were asked

all applicable questions, including questions on susceptibility to use, interest in trying and CED warning statements.

Examples of questions in the CED survey section include “Have you ever tried an energy drink, even a few sips?”, “How old were you when you first tried an energy drink, even just a few sips?”, “When was the LAST TIME you had an energy drink?” and “Have you EVER had an energy drink in the following places?”, with response options ‘At work’, ‘At school’, ‘While driving’, ‘At home’, ‘At someone else’s house’, ‘At a restaurant’, ‘At a bar/pub/nightclub’, ‘At the gym or while playing sports’, ‘open-ended’ option and ‘don’t know’. The complete list of questions and responses can be found in Appendix A.

3.3.3 Alcohol Mixed with Energy Drink Consumption

Patterns of AmED consumption were assessed through a series of nineteen AmED specific questions, fourteen of which were used in this research, three questions on alcohol consumption and three additional questions pertaining to risk behaviour as described in section 3.3.4. The statement “The next questions ask about drinking alcohol and energy drinks together. Alcohol includes beer, wine, coolers, and liquor such as vodka, rum, gin and whiskey.” was included before participants began answering questions for this section to provide clarification on what alcohol should be considered when responding to survey questions. Prompting may also have served to remind participants not to forget certain forms of alcohol they may not have otherwise considered in association with CED consumption.

AmED Awareness

Three questions were posed to assess *AmED Awareness* of all respondents; "Have you ever heard of mixing alcohol with energy drinks?", "Have you ever heard of a *Jägerbomb*?", "Have you ever heard of vodka *Red Bull*?" Response options were 'yes', 'no' and 'don't know'. An index of *AmED Awareness* was derived, where *AmED Awareness* was a positive answer to one or more of the three measures, and answering 'no' to all three measures was considered as unaware of AmED.

AmED Offer

To assess the AmED exposure among *AmED never users,* we asked *AmED never users* only the question "Have you ever been offered alcohol mixed with an energy drink to try?" Response options for *AmED Offer* were 'no', 'yes' and 'don't know, where 'no' and 'don't know' were grouped together.

Alcohol Use

Three questions were asked to assess alcohol patterns of consumption. *Alcohol ever use* was assessed with the question "Have you ever had a drink of alcohol that was more than just a sip?", with response options 'no', 'yes' and 'don't know'. Respondents were removed from the total data set if they did not provide a response to this question, or selected 'don't know' or 'refuse'. *Alcohol current use* was assessed by asking *Alcohol ever users* the question "In the last 12 months, how often did you have a drink of alcohol that was more than just a sip?", with response options 'not at all', 'less than once a month', 'once a month', '2-3 times a month', 'once a week', 'more than once a week' and 'don't know'. 'Don't know' and 'missing' were grouped with 'not

at all'. *Binge drinking* was examined with the question: "In the last 12 months, how often did you have 5 drinks of alcohol or more on one occasion?" with the same response options as for *Alcohol current use* (except 'not at all' which changes to 'I did not have 5 or more drinks on one occasion in the last 12 months.') Coding for *Binge drinking* is the same as for *Alcohol current use*.

AmED Use

AmED ever use was assessed with the question "Have you ever had alcohol and an energy drink (such as *Red Bull*, *Rockstar*, *Monster*, or another brand) on the same occasion (for example during a party)?", with response options 'no', 'yes' and 'don't know'. *AmED ever use* was a positive response, and having tried an AmED (*AmED never use*) included the answers 'no', 'don't know' and all 'missing' responses. *AmED ever users* were asked "In the last 12 months, how often have you had alcohol and an energy drink (such as *Red Bull*, *Rockstar*, *Monster*, or another brand) on the same occasion (for example during a party)?", with response options 'not at all', 'less than once a month', 'once a month', '2-3 times a month', 'once a week', 'more than once a week' and 'don't know' to determine *AmED current use*. Grouping was used to keep *AmED never users* in the sample where applicable, as well as to correct for small response numbers for some options. All respondents were categorized as 'never users', 'not in past twelve months', 'less than once a month', 'once a month' and 'more than once a month'. All 'don't know' and 'missing' responses for *AmED current use* were grouped with 'not in past twelve months' because these respondents would have previously answered 'yes' to ever having an AmED and therefor are not grouped with 'never users'. For further analysis, *AmED current use* was grouped as 'less than once a month' and 'once a month or more'.

AmED Types

AmED Types were determined by asking "The next few questions ask about different ways of having alcohol and energy drinks. Have you ever had any of the following: Select all that apply." and each of the following: "1 an alcoholic energy drink pre-mixed in a bottle or can (for example, *Rockstar+Vodka, Molson Kick, 3A.M.Vodka*, or others)" (*AmED Type 1 pre-mixed*), "2 alcohol and an energy drink that a bartender served you (for example, vodka with *Red Bull*, a *Jägerbomb*, or others)" (*AmED Type 2 bartender served*), "3 alcohol and an energy drink that you mixed together yourself (for example, vodka with *Red Bull*, a *Jägerbomb* or others)" (*AmED Type 3 self-mixed*) and "4 alcohol and an energy drink on the same occasion, but NOT mixed together, such as having an energy drink before going to an event, and then having a beer or other alcoholic beverage later" (*AmED Type 4 same occasion*). Respondent could select all that were applicable. The option 'none of the above' appeared for respondents where the 'no' option was chosen for all previous questions on *AmED Type*. Two respondents were excluded due to 'refusal' to answer.

AmED Susceptibility

An index of *AmED Susceptibility* was created. The questions used to assess AmED susceptibility were adapted from the same questions used to assess CED susceptibility in the current survey. Two questions were posed to assess *AmED Susceptibility*: "Are you interested in trying alcohol mixed with an energy drink in the future?" and "If one of your best friends were to offer you alcohol mixed with an energy drink, would you drink it?". Response options for each question, *Interest in trying AmED in the future* and *Offer of AmED*, were 'Definitely yes', assigned a value of four, 'Probably yes', assigned a value of three, 'Not sure', assigned a value of two, 'Probably

not', assigned a value of one, 'Definitely not', assigned a value of zero and 'don't know', assigned a value of two given this response option corresponds to a lack of certainty or confusion. The sum of each response option is the value on the index of *AmED Susceptibility*, a pseudo-continuous measure from zero to eight, where zero is not susceptible and eight is highly susceptible. Three respondents were excluded for 'refusals' to one or both of the questions use in the index.

AmED Locations of Use

A question on AmED *Location of use* was asked to determine the locations where AmED is consumed most often by youth, and was examined by asking respondents "Have you EVER had alcohol mixed with an energy drink in any of the following places: Select all that apply." The list of seven possible locations included 'At work', 'At school', 'While driving', 'At home', 'At someone else's house', 'At a restaurant', 'At a bar/pub/nightclub', 'Somewhere else → Please specify:' with an open-ended response box. Based on the answers to 'Somewhere else', individual responses were grouped with the corresponding option they best described. In total, thirteen respondents provided a response to the 'open-ended' option, and as a result of the answers provided (e.g. park/outside, at the cottage, camping with friends) an eighth location 'Outdoors' was created. Four respondents were excluded for 'refusals' to answer. A combined outcome of *AmED Location of use: Food and drink establishment* was created by combining responses for *AmED Location of use: At a restaurant* and *AmED Location of use: At a bar/pub/nightclub.*

AmED Reasons for Use

A question was asked to provide information on the most frequent reasons for AmED consumption in this youth population. *AmED Reasons for use* was assessed by asking respondents *AmED ever users* "Have you EVER had alcohol mixed with an energy drink for any of the following reasons? Select all that apply." Response options included 'To get drunk', 'To be able to drink more', 'To avoid a hangover', 'To stay alert for driving', 'To stay awake', 'To boost energy', 'For the taste', 'Someone offered it to me', 'Because my friends were drinking them', 'Curious/Try something new', an 'open-ended' option, 'None of the above' and 'don't know'. The 'open-ended' option, 'Other → Please specify', was recoded to correspond to the option it best described. Only two respondents provided a response in the 'open-ended' option, one of which was grouped with the corresponding option it best described ("to feel drowsy and alert at the same time. Plus it takes the sting out of Vodka." was recoded to 'To be able to drink more'), the other which corresponded to a reason for use already selected by the user ("promotion" was included already in the option 'Someone offered it to me'). Three respondents were excluded for 'refusals' to answer. A combined outcome of *AmED Reasons for use: Intoxication* was created by combining responses for *AmED Reason for use: To get drunk* and *To be able to drink more.* A second outcome, *AmED Reason for use: Energy*, was also created to combine *AmED Reason for use: To stay awake* and *To boost energy*. All AmED specific questions can be found in the CED survey in Appendix A.

3.3.4 Risk Behaviour

Risk behaviour was assessed using three questions worded as "After drinking alcohol, have you ever had an energy drink to be more alert so you could keep partying or stay out longer?", "After

drinking alcohol, have you ever had an energy drink to be more alert to drive?" and "In the last 12 months, have you been in a car when the driver had been drinking alcohol?". Response options were 'no', 'yes' and 'don't know'. Answers 'no' and 'don't know' were combined. The three risk behaviour questions were only asked of select sub-samples of respondents. The first question was asked among respondents who answered 'yes' to ever having had alcohol that was more than just a sip and 'yes' to ever having a CED. The second question, pertaining to having a CED to be more alert to drive, was asked to the same sub-sample as the first question who were also over the age of fifteen. The last question, on being in a car with a driver who had been drinking alcohol, was asked of all respondents over the age of fifteen.

3.3.5 Ethical Clearance

The larger project which encompasses the current study, titled Caffeinated Energy Drinks Survey, was reviewed by the University of Waterloo Office of Research Ethics and received full ethics clearance (ORE #19401).

4.0 ANALYSIS

Analysis included descriptive statistics for all primary variables. Logistic regression models were fitted for a total of ten outcomes: *AmED awareness, AmED ever use, AmED current use, AmED type 1: pre-mixed, AmED Type 2: bartender served, AmED Type 3 self-mixed, AmED Location of use: Food and drink establishment, AmED reason for use: Intoxication, AmED reason for use: Energy,* and *Risk behaviour: In car with drinking driver*. Odds ratios (OR), 95% confidence intervals (95% CI) and p-values are reported. Logistic regression models include the following categorical socio-demographic variables: *Gender, Age, Ethnicity, Province, BMI, Sleep time, Difficulty staying awake, School grades, Maternal education,* and *Spending money*. The pseudo-continuous variable *sensation-seeking* index was also included in all models. In addition, *Weight behaviour* was included in models for *AmED awareness, AmED ever use* and *AmED current use only*. For each model, the pair-wise contrasts for levels within a variable are only shown if the effect of the overall variable was significant.

No adjustments were made to account for multiple comparisons. The covariates included were chosen based on assumptions from previous research and the study is population based; therefore, adjusting for multiple errors could in fact lead to greater errors of interpretation as described in by Rothman (1990).(152) Nevertheless, a relatively large number of multiple comparisons were investigated, therefore, this aspect of the analysis may be considered exploratory in nature.

Respondents with missing data for *province, age, gender*, and who answered ‘don’t know’ or ‘refuse’ to *Alcohol ever use* were removed from the final sample (n=66). For all models, except

AmED awareness and *AmED ever use*, analyses excluded respondents who did not report an answer for *difficulty staying awake*, due to very low frequency (n=2 among *AmED ever users*) All analyses were conducted using the statistical software package IBM® SPSS® Statistics 22 (IBM Corp Armonk, NY). Statistical tests for each of the primary hypotheses are described below.

4.1 Hypotheses

The hypotheses for this research study are as follows:

Hypothesis 1. The awareness and use of AmED among Canadian youth will be higher among certain groups compared to others and will vary by socio-demographic variables.

Hypothesis 1a. We hypothesized that *AmED Awareness*, examined among *AmED never users*, would be higher among young adults, who usually get lower marks in school and who reported a lower level of maternal education.

To test this hypotheses, logistic regression models were fitted among *AmED never users* with *AmED Awareness* as the main outcome. The following covariates were included in the model*: Gender, Age, Ethnicity, Province, BMI, Weight loss behaviour, Sleep time, Difficulty staying awake, School grades, Maternal education, Spending money, Sensation-seeking* and *Binge drinking*.

Hypothesis 1b. We hypothesized that *AmED Ever Use* and *AmED Current Use* would be higher among young adults, who usually get lower marks in school, who more frequently find it

difficult to stay awake during normal waking hours, who reported a lower level of maternal education, who have greater spending money and who are living in the Canadian prairies (AB, SK, MB) or Quebec, where the legal drinking age is 18 compared to 19 in the rest of Canada (except in Saskatchewan). Binge drinking would also be higher among *AmED Ever Use* and *AmED Current Use.*

To test these hypotheses, two logistic regression models were fitted with the outcomes *AmED Ever Use* and *AmED Current Use*. *AmED Ever Use* was examined among the whole sample, and *AmED Current Use* was examined among *AmED Ever Users* who provided a response for *Difficulty staying awake* and who are over the age of fifteen (due to small cell size). The following covariates were entered into each model: *Gender, Age, Ethnicity, Province, BMI, Weight loss behaviour, Sleep time, Difficulty staying awake, School grades, Maternal education, Spending money, Sensation-seeking* and *Binge drinking*.

Hypothesis 2. We hypothesized that among *AmED Ever Users*, certain *AmED Types* would be more prevalent among certain groups. We hypothesized that among *AmED Ever Users*, use of *AmED Type 3 self-mixed* and *AmED Type 2 bartender-served*, would be higher among those who reported greater binge drinking behaviour. *AmED Type 3 self-mixed* would be greater among youth. *AmED Type 2 bartender-served* would be greater among young adults with greater spending money.

A total of three logistic regression models were fitted among *AmED ever users* (who provided a response for *Difficulty staying awake*) with the following outcomes: *AmED Type 1 pre-mixed,*

AmED Type 2 bartender-served and *AmED Type 3 self-mixed.* All three models included *Gender, Age, Ethnicity, Province, BMI, Sleep time, Difficulty staying awake, School grades, Maternal education, Spending money, Sensation-seeking* and *Binge drinking*.

Hypothesis 3. We hypothesized that among *AmED Ever Users*, certain *Locations of Use* of AmED would be more prevalent among certain groups. We hypothesized that among *AmED Ever Users, AmED Location of Use: Food and drink establishment* would be higher among young adults, those with greater spending money and those who reported binge drinking.

A logistic regression model was fitted among *AmED ever users* (who provided a response for *Difficulty staying awake*) with the outcomes *AmED Location of Use: Food and drink establishment*. The model included *Gender, Age, Ethnicity, Province, BMI, Sleep time, Difficulty staying awake, School grades, Maternal education, Spending money, Sensation-seeking* and *Binge drinking*.

Hypothesis 4. We hypothesized that among *AmED Ever Use*rs, some *Reasons for Use* would be more prevalent among certain socio-demographic groups and types of users than others. We hypothesized that among *AmED Ever Use*rs, *AmED Reasons for Use: Intoxication,* would be higher among young adults, those with lower reported maternal education, a greater sensation-seeking, and greater reported binge drinking. *AmED Reasons for Use: Energy* would be higher among those who reported shorter sleep time and difficulty staying awake.

Two logistic regression models were fitted for each *Reason for Use: Intoxication* and *Energy*, as the main outcome, among *AmED ever users* (who provided a response for *Difficulty staying awake*), with the following covariates: *Gender, Age, Ethnicity, Province, BMI, Sleep time, Difficulty staying awake, School grades, Maternal education, Spending money, Sensation-seeking* and *Binge drinking.*

Hypothesis 5. We hypothesized that *Risk Behaviour* would be higher among certain socio-demographic groups. We hypothesized that *Risk Behaviour: In car with drinking driver*, would be higher among those who reported lower maternal education, greater sensation-seeking and greater binge drinking.

Risk Behaviour: In car with drinking driver was entered in a logistic regression model as the main outcome, among *AmED ever users*, over the age of fifteen, and who provided a response for *Difficulty staying awake.* The covariates included in the model were: *Gender, Age, Ethnicity, Province, BMI, Sleep time, Difficulty staying awake, School grades, Maternal education, Spending money, Sensation-seeking* and *Binge drinking.*

5.0 RESULTS

5.1 Sample Characteristics

The total number of completed surveys was 2055, with seven respondents removed permanently from the data due to missing responses for province, age or gender, resulting in a total of 2048. An additional 59 respondents, who answered 'don't know' (n=45) or 'refuse' (n=14) to the question for *Alcohol ever use* were removed. The final survey sample for this research includes 1989 respondents.

Table 2 describes the sample characteristics among the total sample. There was approximately eleven percent more females than males, and just over three quarters of the sample were 'White'. The mean age of the total sample was 18.23 (SD=3.7) and the mean age among *AmED ever users* was almost three years older, 21.0 (SD=2.5). Among all respondents, 51.2% (n=1019) of the total sample was below the legal drinking age according to their province of residence (18 in AB, QC, MB, and 19 in all other provinces and territories). A description of age distribution can be found in Appendix B. Representation among provinces varied widely, with the highest representation from Quebec (40.2%), Ontario (30.3%) and British Columbia (11.0%). There were very few people from the Territories, Newfoundland and Saskatchewan (<1.2% each).

The majority of respondents were of healthy weight according to their *BMI* and the greatest proportion of respondents from the total sample had no current weight loss efforts (32.1%). There was a relatively equal distribution over *Sleep time*, but almost half the sample reporting 'never/rarely' having *Sleep trouble* or *Difficulty staying awake*. Distribution of *Maternal education* was relatively even with a slightly higher number reporting 'higher education'. *School*

grades were concentrated primarily between 70% and 89%. Reported *Spending money* was relatively evenly distributed (around 25%), except for 'zero dollars' that only accounted for 14%.

Table 2. Sample characteristics among all respondents (n=1989)

Characteristics	All respondents	
	% (n)	
Sex		
Female	55.1	(1096)
Male	44.9	(893)
Age		
12 to 14 years	19.2	(381)
15 to 17 years	30.6	(608)
18 to 20 years	16.5	(328)
21 to 24 years	33.8	(672)
Ethnicity		
White	77.0	(1531)
Other	23.0	(458)
Province		
Alberta	8.9	(178)
British Columbia	11.0	(218)
Manitoba	2.7	(54)
New Brunswick	1.6	(32)
Newfoundland	0.6	(12)
North West Territories	0.1	(2)
Nova Scotia	2.3	(46)
Nunavut	0.2	(3)
Ontario	30.3	(605)
Prince Edward Island	0.7	(14)
Quebec	40.2	(800)
Saskatchewan	1.2	(24)
Yukon	0.1	(1)
Province (categories)		
British Columbia	11.0	(218)
AB, SK, MB	12.9	(256)
Ontario	30.4	(605)
Quebec	40.2	(800)
Maritimes & Territories	5.5	(110)

Characteristics	All respondents	
	% (n)	
Body Mass Index (BMI)		
Underweight	5.0	(99)
Healthy weight	60.3	(1199)
Overweight	16.3	(324)
Obese	7.6	(152)
Not reported	10.8	(215)
Weight Behaviour		
Lose weight	29.7	(591)
Gain weight	9.7	(193)
Stay the same weight	27.4	(545)
No weight loss efforts	32.1	(638)
Not reported	1.1	(22)
Health Conditions		
None reported	97.3	(1936)
Diabetes or heart condition	2.7	(53)
Sleep time/duration		
≤ 7 hours	31.2	(621)
8 hours	35.6	(708)
≥ 9 hours	28.2	(560)
Not reported	5.0	(100)
Sleep trouble		
Never/rarely	47.6	(946)
Sometimes	37.0	(736)
Most of/all of the time	14.0	(279)
Not reported	1.4	(28)
Difficulty staying awake		
Never/rarely	51.3	(1021)
Sometimes	37.2	(739)
Most of/all of the time	10.1	(200)
Not reported	1.5	(29)
School grades		
≤ 59%	2.0	(39)
60-69%	11.6	(231)
70-79%	35.4	(705)
80-89%	38.8	(772)
90-100%	10.5	(208)
Not reported	1.7	(34)
Mother Education		
High School or less	27.6	(549)
Some additional training	33.3	(662)
Higher Education	35.8	(712)
Not reported	3.3	(66)

Characteristics	All respondents	
	% (n)	
Spending Money		
Zero	14.0	(279)
$1 to $20	27.7	(550)
$21 to $100	23.2	(459)
> $100	24.2	(482)
Not reported	11.0	(219)

Table 3 shows the distribution of responses to the three *Sensation-seeking* measures.

Table 3. *Sensation-seeking* traits among all respondents and *AmED ever users*

Characteristics	I like to do frightening things.		I like new and exciting experiences, even if I have to break the rules.		I prefer friends who are exciting and unpredictable.	
	All (n=1989) % (n)	Ever users (n=502) % (n)	All (n=1989) % (n)	Ever users (n=502) % (n)	All (n=1989) % (n)	Ever users (n=502) % (n)
Strongly Disagree	19.2 (382)	13.9 (70)	19.2 (382)	8.0 (40)	8.3 (166)	4.2 (21)
Disagree	28.1 (560)	26.1 (131)	28.1 (560)	18.1 (91)	26.2 (522)	18.9 (95)
Neither agree nor disagree	30.4 (605)	30.3 (152)	30.4 (605)	30.7 (154)	37.9 (754)	39.0 (196)
Agree	18.3 (364)	24.3 (122)	18.3 (364)	36.3 (182)	23.0 (458)	31.1 (156)
Strongly Agree	3.9 (78)	5.4 (27)	3.9 (78)	7.0 (35)	4.5 (89)	6.8 (34)

An overall index of *Sensation-seeking* was created by summing the response values from each sensation-seeking question, where zero is strongly disagree to all three questions and twelve is strongly agree to all three questions, as shown in Table 4. There appear to be results approaching a normal distribution among total sample and *AmED ever users*, with sensation-seeking higher among *AmED ever users*.

Table 4. *Sensation-seeking index among all respondents and *AmED ever users***

Value	All respondents (n=1989) % (n)		AmED ever users (n=502) % (n)	
0	4.9	(98)	2.4	(12)
1	3.0	(60)	2.4	(12)
2	6.9	(137)	3.6	(18)
3	11.7	(232)	6.6	(33)
4	13.7	(272)	10.2	(51)
5	11.9	(236)	11.0	(55)
6	16.0	(319)	18.7	(94)
7	11.7	(233)	15.5	(78)
8	8.9	(177)	11.2	(56)
9	6.9	(138)	10.4	(52)
10	2.4	(48)	4.6	(23)
11	1.2	(23)	2.6	(13)
12	0.8	(16)	1.0	(5)

*Where sensation-seeking index is the sum of response values from each sensation-seeking questions.

5.2 AmED Awareness

Table 5 shows awareness of *AmED* among *AmED never users.* Overall more than six out of every ten respondents who had never had AmED reported awareness of AmEDs. A majority of respondents reported awareness of "mixing alcohol with an energy drink" (53.3%), followed by vodka *Red Bull* (42.8%) and a *Jägerbomb* (28.2%). As Table 5 indicates, approximately 10% of respondents who reported no awareness in response to the general question on mixing alcohol with a CED (53.3%), subsequently reported awareness of either *Jägerbomb* or Vodka *Red Bull*, as seen from overall awareness (63.3%).

Table 5. *AmED Awareness* among *AmED never users*

Response	Mixing alcohol with CED (n=1481) % (n)		*Jägerbomb* (n=1483) % (n)		Vodka *Red Bull* (n=1482) % (n)		Any* (n=1484) % (n)	
No & Not Reported	46.6	(691)	71.8	(1065)	57.2	(847)	36.7	(545)
Yes	53.3	(790)	28.2	(418)	42.8	(635)	63.3	(939)

*Where Any Awareness is yes to one or more of mixing alcohol with CED, *Jägerbomb* or vodka *Red Bull*

A logistic regression was fitted to examine correlates of *AmED Awareness* among *AmED never users* (see Table 6). *AmED Awareness* was significantly greater among young adults compared to younger individuals, in particular compared to the youngest age group. Twenty one to twenty four year olds were almost three times more likely to be aware of AmED compared to twelve to fourteen year olds. Respondents of 'White' ethnicity were also more likely to be aware of AmED compared to 'other', and respondents with 'healthy weight' or 'overweight' compared to those 'not reported'. Differences were also observed for *Sleep time*, where those who report sleeping seven hours or less were more likely than respondents reporting more than seven hours of sleep to be aware of AmED. *Spending money* was also associated with *AmED awareness*: respondents who reported $21-$100 or more than $100 were more likely to be aware of AmED compared to those who have less than $20. Odds of *AmED awareness* also increased with *Sensation-seeking* behaviour and *Binge drinking*, as shown in Table 6.

Table 6. Estimates from a logistic regression model for *AmED Awareness* among *AmED never users* (n=1484)

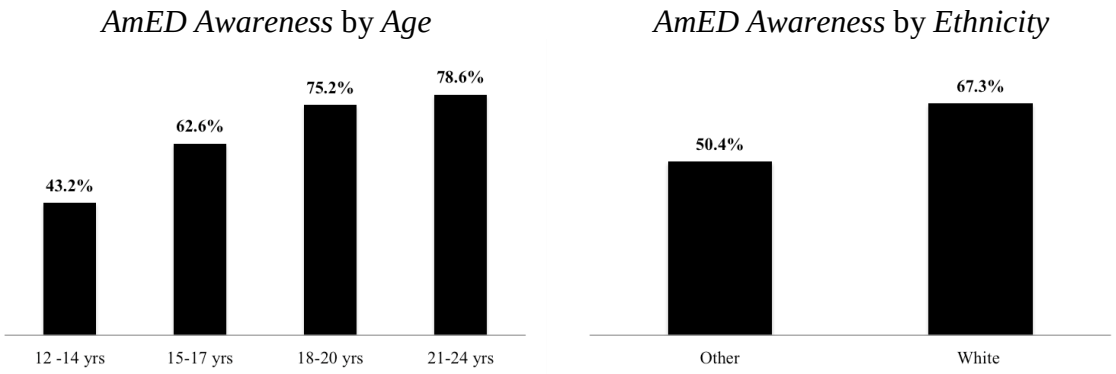
Characteristics	B	S.E.	Wald X^2	OR	95% CI	P value
Gender	-0.02	0.13	0.02	0.98	0.76-1.27	.898
Age			26.24			**<.001**
12-14 vs. 15-17	0.49	0.15	10.29	1.624	1.21-2.18	.001
12-14 vs. 18-20	0.87	0.24	12.99	2.384	1.49-3.82	<.001
12-14 vs. 21-24	1.08	0.22	23.76	2.941	1.91-4.54	<.001
15-17 vs. 18-20	0.38	0.22	2.93	1.47	0.95-2.28	.087
15-17 vs. 21-24	0.59	0.20	8.76	1.81	1.22-2.69	.003
18-20 vs. 21-24	0.21	0.24	0.80	1.23	0.78-1.95	.371
Ethnicity			31.41			**<.001**
Other vs. White	0.87	0.16	31.41	2.38	1.76-3.23	<.001
Province			3.94			.415
BMI			14.16			**.007**
Underweight vs. Healthy weight	0.30	0.28	1.22	1.36	0.79-2.32	.270
Underweight vs. Overweight	0.29	0.31	0.86	1.34	0.72-2.46	.354
Underweight vs. Obese	-0.08	0.37	0.05	0.92	0.45-1.91	.831
Underweight vs. Not reported	-0.40	0.32	1.50	0.67	0.36-1.27	.220
Healthy weight vs. Overweight	-0.01	0.18	0.01	0.99	0.69-1.41	.939
Healthy weight vs. Obese	-0.38	0.27	2.04	0.68	0.40-1.15	.153
Healthy weight vs. Not reported	-0.70	0.20	12.14	0.50	0.34-0.74	<.001
Overweight vs. Obese	-0.37	0.29	1.64	0.69	0.93-1.21	.200
Overweight vs. Not reported	-0.69	0.24	7.87	0.50	0.31-0.81	<.001
Obese vs. Not reported	-0.32	0.31	1.04	0.73	0.40-1.34	.308
Weight behaviour			6.23			.182
Sleep time			13.54			**.004**
≤ 7 hours vs. 8 hours	-0.49	0.17	8.58	0.62	0.44-0.85	.003
≤ 7 hours vs. ≥ 9 hours	-0.62	0.17	12.72	0.54	0.38-0.76	<.001
≤ 7 hours vs. Not reported	-0.27	0.32	0.74	0.76	0.40-1.42	.389
8 hours vs. ≥ 9 hours	-0.14	0.15	0.88	0.87	0.66-1.16	.348
8 hours vs. Not reported	0.21	0.31	0.44	1.23	0.67-2.28	.505
≥ 9 hours vs. Not reported	0.35	0.32	1.17	1.41	0.76-2.63	.279
Trouble staying awake			6.807			.078
School grades			4.98			.418
Maternal education			4.60			.203
Spending money			14.32			**.006**
$0 vs. $1-$20	0.01	0.18	0.01	1.00	0.71-1.43	.980
$0 vs. $21-$100	0.50	0.20	6.04	1.64	1.11-2.44	.014
$0 vs. >$100	0.63	0.24	6.84	1.88	1.17-3.01	.009
$0 vs. Not reported	0.25	0.25	0.98	1.28	0.79-2.08	.322
$1-$20 vs. $21-$100	0.49	0.17	8.47	1.63	1.17-2.28	.004
$1-$20 vs. >$100	0.63	0.22	7.86	1.87	1.21-2.90	.005
$1-$20 vs. Not reported	0.24	0.23	1.11	1.27	0.81-1.99	.291
$21-$100 vs. >$100	0.13	0.23	0.35	1.14	0.73-1.79	.554
$21-$100 vs. Not reported	-0.25	0.24	1.10	0.78	0.49-1.24	.293
>$100 vs. Not reported	-0.39	0.27	2.08	0.68	0.40-1.15	.149
Sensation-seeking	0.06	0.02	6.18	1.06	1.01-1.12	**.013**

Characteristics	B	S.E.	Wald X^2	OR	95% CI	P value
Binge Drinking			25.50			**<.001**
Did not vs. < Once a month	0.98	0.24	16.12	2.66	1.65-4.30	<.001
Did not vs. Once a month	1.14	0.49	5.49	3.13	1.21-8.13	.019
Did not vs. 2-3 times a month	1.42	0.64	4.84	4.12	1.17-14.56	.028
Did not vs. Once a week	1.30	0.80	2.63	3.67	0.76-17.71	.105
Did not vs. > Once a week	-0.49	1.20	0.17	0.61	0.06-6.41	.683
< Once a month vs. Once a month	0.16	0.53	0.09	1.17	0.42-3.31	.764
< Once a month vs. 2-3 times a month	0.44	0.68	0.41	1.55	0.41-5.85	.521
< Once a month vs. Once a week	0.33	0.83	0.15	1.38	0.27-7.06	.696
< Once a month vs. > Once a week	-1.50	1.22	1.52	0.22	0.02-2.42	.218
Once a month vs. 2-3 times a month	0.26	0.80	0.11	1.30	0.27-6.20	.741
Once a month vs. Once a week	0.14	0.92	0.02	1.15	0.19-7.04	.879
Once a month vs. > Once a week	-1.61	1.29	1.57	0.20	0.02-2.48	.210
2-3 times a month vs. Once a week	-0.12	1.01	0.02	0.89	0.12-6.43	.904
2-3 times a month vs. > Once a week	-1.88	1.35	1.93	0.15	0.01-2.15	.164
Once a week vs. > Once a week	-1.75	1.43	1.50	0.17	0.01-2.87	.221

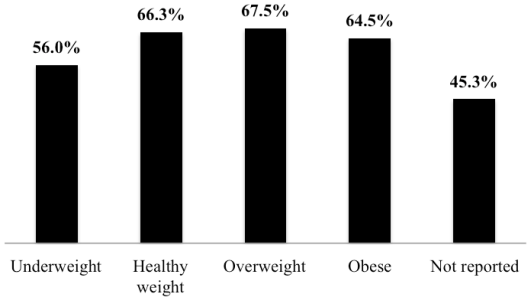
*Model: chi-square: 311.9 p<.001; Nagelkerke R^2=.259
*The variable listed first is the reference
*Pairwise contrasts within variables are not shown for Gender, Province, Weight behaviour, Trouble staying awake, School grades and Maternal education given that the overall effect of these variables was not significant.

Figure 5 shows the bivariate associations between *AmED awareness* and each of the variables significantly associated with this outcome in the logistic regression.

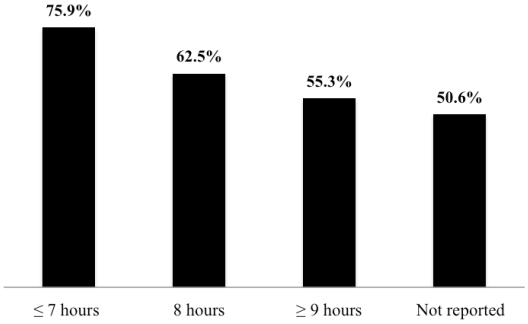
Figure 5. Percentage of *AmED never users* aware of AmED, by significant covariate (n=1484)



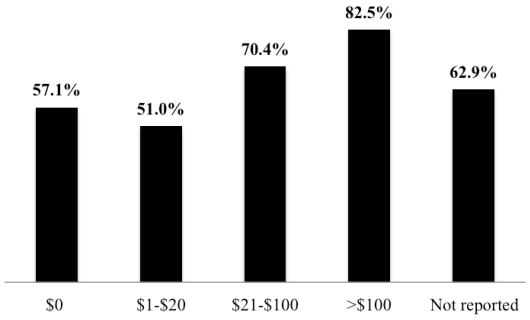
AmED Awareness by *BMI*



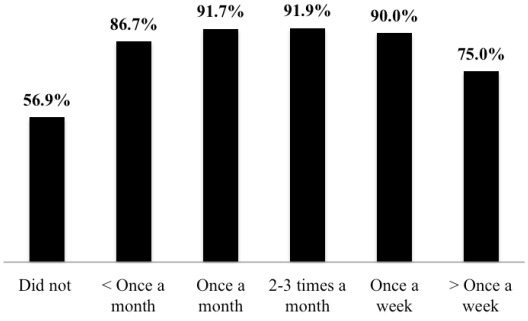
AmED Awareness by *Sleep time*



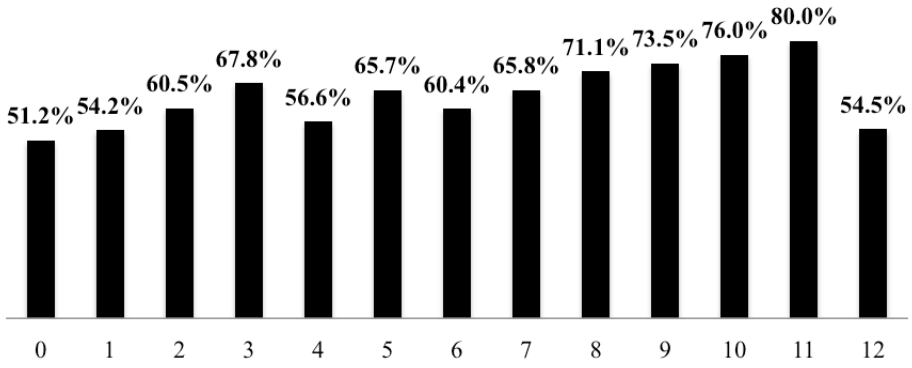
AmED Awareness by *Spending money*



AmED Awareness by *Binge drinking*



AmED Awareness by *Sensation-seeking*



5.3 Alcohol Use and Patterns of Consumption

Alcohol consumption was assessed using three measures, *Alcohol Ever Use*, *Alcohol Current Use*, and *Binge Drinking* as outlined in Table 7. The first measure, *Alcohol Ever Use*, was reported by the total sample. Six out of ten participants reported having had alcohol that was more than just a sip. For *Alcohol Current Use* the greatest proportion reported consuming

alcohol ‘not at all in the past twelve months’, which included those who had never had alcohol. Decreasing rates of reported use are observed among total respondents for the *Alcohol Current Use* measure; however, just over a quarter of respondents report alcohol consumption of ‘two to three times a month’ or more. Though reported frequency of *Binge drinking* appears to decrease, it remains that 18.9% of all respondents, 31% of *AmED ever users*, binge drink once a month or more.

Table 7. Alcohol patterns of use among all respondents (n=1989)

Outcome	All respondents % (n)	
Alcohol Ever Use		
Never	39.7	(789)
Ever	60.3	(1200)
Alcohol Current Use (past 12 mo.)		
Not at all	43.8	(869)
Less than once a month	23.1	(459)
Once a month	8.0	(159)
2-3 time a month	11.2	(223)
Once a week	7.3	(145)
More than once a week	6.6	(131)
Binge Drinking		
Not in past 12 months	62.6	(1245)
Less than once a month	18.5	(368)
Once a month	7.4	(147)
2-3 time a month	6.5	(129)
Once a week	3.6	(72)
More than once a week	1.4	(27)

5.4 AmED Prevalence of Use

AmED patterns of use are shown in Table 8. One in four respondents reported ever having AmED. Among *AmED ever users*, 0.8% were twelve to fourteen years of age, 12.7% were fifteen to seventeen, 22.7% were eighteen to twenty and 63.7% were twenty one to twenty four

years of age. Among respondents who have never had AmED, less than two out of every ten respondents (15.8%) had been offered alcohol mixed with an energy drink to try. *AmED current use* was most frequently reported as 'less than once a month' (14.2 % among total sample, 56.6% among *AmED ever users*). Of the nearly ten percent *AmED ever users* who reported AmED use 'more than once a month', 6.4% reported consumption '2-3 times a month', 1.2% reported 'once a week' and 0.8% reported 'more than once a week'. Given the small number who reported AmED use over once a month in the past 12 month, these individuals were grouped into a category of 'more than once a month'.

Respondents also identified types of AmED they had ever had. The majority of *AmED ever users* reported ever having AmED that a bartender served them (63.0%), followed by AmED that they mixed themselves (57.4%), pre-mixed in a bottle or can (37.2%), and, lastly, on the same occasion, but not mixed together (31.0%).

Table 8. AmED patterns of use among all respondents and *AmED ever users*

Outcome	All respondents (n=1989) % (n)		AmED ever users (n=502) % (n)	
AmED Ever Use				
Never	74.7	(1484)	-	-
Ever	25.3	(502)	100.0	(502)
AmED Current Use				
Never Users	74.9	(1487)	-	-
Not in past 12 months	6.5	(129)	25.9	(129)
Less than once month	14.2	(282)	56.5	(282)
Once month	2.3	(46)	9.2	(46)
More than once a month	2.1	(42)	8.4	(42)
Ever had pre-mixed AmED				
No	90.5	(1801)	62.8	(314)
Yes	9.4	(186)	37.2	(186)

Outcome	All respondents (n=1989) % (n)		AmED ever users (n=502) % (n)	
Ever had AmED bartender served				
No	84.1	(1672)	37.0	(185)
Yes	15.9	(315)	63.0	(315)
Ever had self-mixed AmED				
No	85.6	(1700)	42.6	(213)
Yes	14.4	(287)	57.4	(287)
Ever had AmED on same occasion				
No	92.2	(1832)	69.0	(345)
Yes	7.8	(155)	31.0	(155)

A logistic regression was fitted to examine correlates of *AmED ever use* among the total sample (see Table 9). *Age* was significantly associated with ever having used AmED, with every age group significantly more likely to have consumed AmED compared to every younger age group. Twenty one to twenty four year olds were more than seventeen times more likely to have had AmED compared to twelve to fourteen year olds. Respondents in Quebec were less likely to have had AmED compared to those living in Alberta, Saskatchewan, Manitoba and British Columbia. Greater *Sensation-seeking* and *Binge drinking* was also associated with increased likelihood of consuming AmEDs. All those who reported *Binge drinking* to varying degrees were significantly more likely than those who did not binge drink in the last twelve months to report having AmED. Those who binge drink 'more than once a week' were approximately five times more likely to have had AmED compared to those who binge drink 'once a month' or 'less than once a month', and almost seventy times more likely than those who 'did not' binge drink in the last twelve month.

Table 9. Estimates from a logistic regression model for *AmED ever use* among the total sample (n=1985)

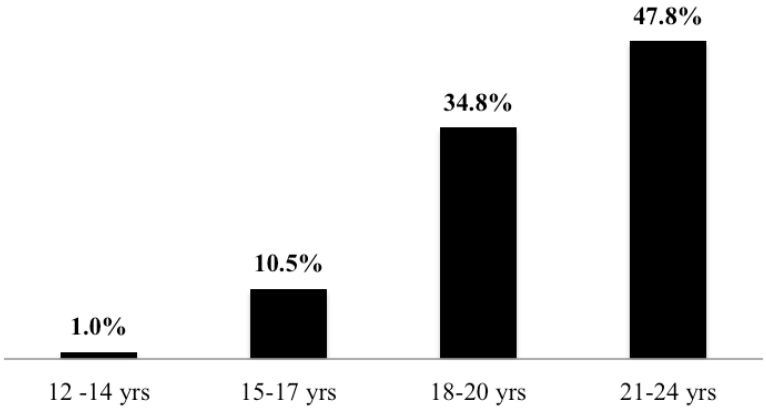
Characteristics	B	S.E.	Wald X^2	OR	95% CI	P value
Gender	-0.28	0.16	3.04	0.75	0.55-1.04	.081
Age			56.30			**<.001**
12-14 vs. 15-17	1.59	0.55	8.46	4.92	1.68-14.39	.004
12-14 vs. 18-20	2.25	0.56	16.10	9.44	3.15-28.27	<.001
12-14 vs. 21-24	2.86	0.55	26.93	17.43	5.92-51.30	<.001
15-17 vs. 18-20	0.65	0.23	7.95	1.92	1.22-3.02	.005
15-17 vs. 21-24	1.27	0.21	37.30	3.54	2.36-5.32	<.001
18-20 vs. 21-24	0.61	0.18	12.22	1.85	1.31-2.60	<.001
Ethnicity	0.09	0.19	0.23	1.09	0.76-1.57	.632
Province			11.607			**.021**
BC vs. AB, SK, MB	-0.26	0.28	0.84	0.77	0.45-1.34	.359
BC vs. ON	-0.47	0.25	3.58	0.62	0.38-1.02	.059
BC vs. QC	-0.74	0.24	9.34	0.48	0.30-0.77	.002
BC vs. Mar. & Ter.	-0.65	0.37	3.09	0.52	0.25-1.08	.079
AB, SK, MB vs. ON	-0.21	0.23	0.85	0.81	0.51-1.27	.356
AB, SK, MB vs. QC	-0.48	0.22	4.73	0.62	0.40-0.95	.030
AB, SK, MB vs. Mar. & Ter.	-0.39	0.36	1.19	0.68	0.34-1.36	.275
ON vs. QC	-0.27	0.18	2.15	0.78	0.54-1.09	.142
ON vs. Mar. & Ter.	-0.18	0.33	0.28	0.84	0.44-1.61	.596
QC vs. Mar. & Ter.	0.09	0.32	0.08	1.09	0.58-2.06	.782
BMI			4.09			.393
Weight behaviour			1.35			.852
Sleep time			0.30			.960
Trouble staying awake			2.98			.395
School grades			7.88			.163
Maternal education			2.03			. 567
Spending money			4.34			.362
Sensation-seeking	0.09	0.03	10.15	1.10	1.04-1.16	**.001**
Binge Drinking			265.42			**<.001**
Did not vs. < Once a month	2.55	0.19	188.73	12.86	8.94-18.52	<.001
Did not vs. Once a month	2.75	0.24	135.30	15.69	9.87-24.94	<.001
Did not vs. 2-3 times a month	3.19	0.26	148.22	24.17	14.48-40.37	<.001
Did not vs. Once a week	3.06	0.32	89.43	21.29	11.30-40.13	<.001
Did not vs. > Once a week	4.21	0.60	49.41	67.13	20.78-216.92	<.001
< Once a month vs. Once a month	0.20	0.21	0.86	1.22	0.80-1.85	.354
< Once a month vs. 2-3 times a month	0.63	0.24	6.92	1.88	1.18-3.01	.009
< Once a month vs. Once a week	0.51	0.31	2.75	1.66	0.91-3.03	.097
< Once a month vs. > Once a week	1.65	0.59	7.86	5.22	1.65-16.57	.005
Once a month vs. 2-3 times a month	0.43	0.27	2.48	1.54	0.90-2.64	.115
Once a month vs. Once a week	0.31	0.33	0.86	1.36	0.71-2.61	.354
Once a month vs. > Once a week	1.45	0.60	5.78	4.27	1.31-13.94	.016
2-3 times a month vs. Once a week	-0.12	0.35	0.13	0.88	0.45-1.74	.721
2-3 times a month vs. > Once a week	1.02	0.61	2.78	2.77	0.84-9.21	.096
Once a week vs. > Once a week	1.14	0.64	3.21	3.14	0.90-10.97	.073

*Model: chi-square: 934.4 p<.001; Nagelkerke R^2=.555
*The variable listed first is the reference
*Pairwise contrasts within variables are not shown for Gender, Ethnicity, BMI, Weight behaviour, Sleep time, Trouble staying awake, School grades, Maternal education and Spending money given that the overall effect of these variables was not significant.

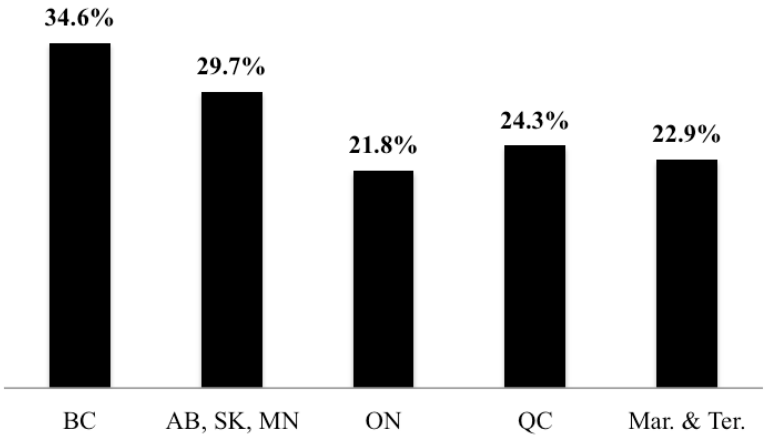
Figure 6 shows the bivariate associations between *AmED ever use* and each of the variables significantly associated with this outcome in the logistic regression.

Figure 6. Percentage of total respondents who reported ever using AmED, by significant covariate (n=1986)

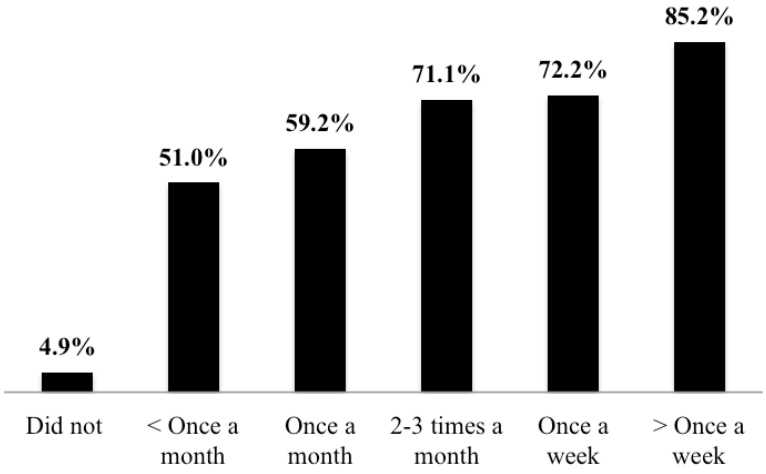
AmED ever use by *Age*



AmED ever use by *Province*



AmED ever use by *Binge drinking*



A logistic regression was fitted to examine correlates of *AmED current use* among *AmED ever users* (see Table 10). Respondents of 'other' ethnicities were more likely than 'Whites' to have AmED once a month or more, as were respondents who did not report *Sleep time* compared to those who did. All respondents who reported *Binge drinking* 'once a month' to 'more than once a week' were significantly more likely to consume AmED 'once a month or more' compared to all those who reported 'did not' binge drink in the last twelve month or 'less than once a month'. Those who reported binge drinking 'more than once a week' were almost ninety times more likely to have AmED at least once a month compared to respondents who 'did not' binge drink in the last twelve months.

Table 10. Estimates from a logistic regression model for *AmED current use* among *AmED ever users* (n=493)

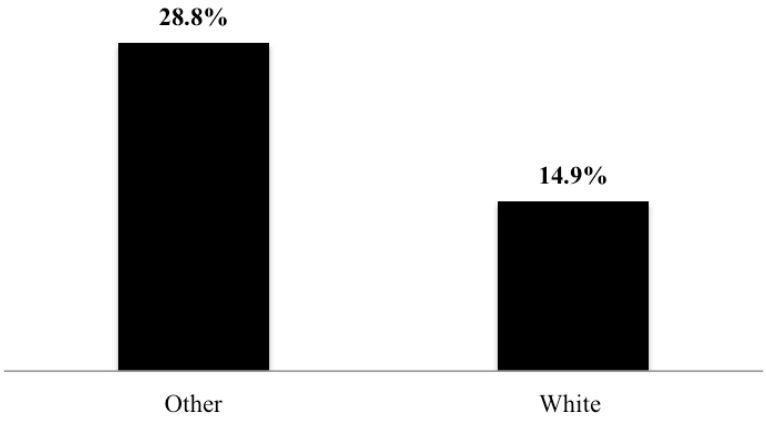
Characteristics	B	S.E.	Wald X^2	OR	95% CI	P value
Gender	-0.01	0.35	<.001	0.99	0.50-1.98	.986
Age			4.73			.094
Ethnicity (Other vs. White)	-1.12	0.37	9.35	0.33	0.16-0.67	**.002**
Province			5.71			.222
BMI			2.79			.593
Weight behaviour			2.32			.677
Sleep time			14.38			**.002**
≤ 7 hours vs. 8 hours	0.06	0.34	0.03	1.06	0.54-2.09	.856
≤ 7 hours vs. ≥ 9 hours	0.40	0.46	0.78	1.50	0.61-3.65	.378
≤ 7 hours vs. Not reported	3.43	0.91	14.10	30.75	5.14-183.87	<.001
8 hours vs. ≥ 9 hours	0.34	0.45	0.56	1.41	0.58-3.38	.448
8 hours vs. Not reported	3.36	0.93	13.09	28.89	4.67-178.67	<.001
≥ 9 hours vs. Not reported	3.02	0.95	10.18	20.57	3.21-131.75	.001
Trouble staying awake			2.11			.347
School grades			3.81			.577
Maternal education			3.13			.372
Spending money			6.85			.144
Sensation-seeking	0.08	0.07	1.35	1.08	0.95-1.22	.245
Binge Drinking			46.34			**<.001**
Did not vs. < Once a month	1.29	1.12	1.33	3.65	0.41-32.86	.249
Did not vs. Once a month	3.36	1.13	8.89	28.81	3.16-262.36	.003
Did not vs. 2-3 times a month	4.11	1.12	13.45	61.15	6.79-550.89	<.001
Did not vs. Once a week	4.13	1.16	12.67	61.86	6.38-599.28	<.001
Did not vs. > Once a week	4.47	1.23	13.34	87.70	7.95-967.74	<.001
< Once a month vs. Once a month	2.07	0.49	17.72	7.90	3.02-20.68	<.001
< Once a month vs. 2-3 times a month	2.82	0.48	33.91	16.77	6.49-43.32	<.001
< Once a month vs. Once a week	2.83	0.56	25.59	16.96	5.66-50.80	<.001
< Once a month vs. > Once a week	3.18	0.68	21.87	24.05	6.34-91.19	<.001
Once a month vs. 2-3 times a month	0.75	0.39	3.65	2.12	0.98-4.60	.056
Once a month vs. Once a week	0.76	0.47	2.67	2.15	0.86-5.37	.102
Once a month vs. > Once a week	1.11	0.63	3.15	3.04	0.89-10.42	.076
2-3 times a month vs. Once a week	0.01	0.44	0.01	1.01	0.43-2.38	.979
2-3 times a month vs. > Once a week	0.36	0.61	0.36	1.43	0.44-4.69	.551
Once a week vs. > Once a week	0.35	0.65	0.29	1.42	0.40-5.02	.588

*Model: chi-square: 133.3 p<.001; Nagelkerke R^2=.389
*The variable listed first is the reference
*Pairwise contrasts within variables are not shown for Gender, Age, Province, BMI, Weight behaviour, Trouble staying awake, School grades, Maternal education, Spending money and Sensation-seeking given that the overall effect of these variables was not significant.

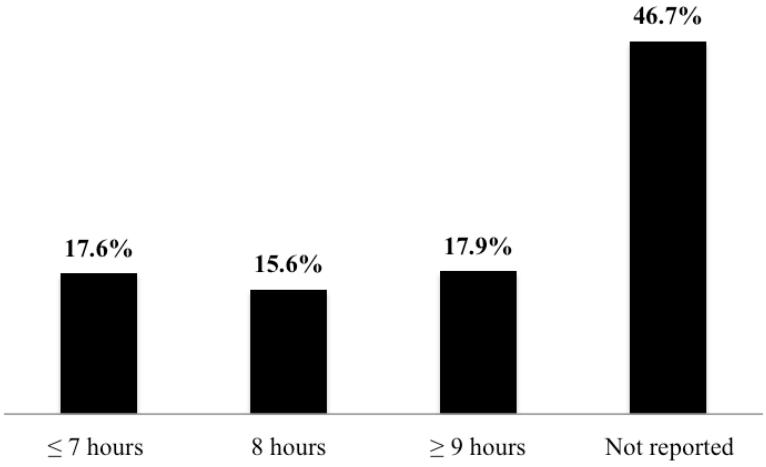
Figure 7 shows the bivariate associations between *AmED current use* among *AmED ever users* and each of the variables significantly associated with this outcome in the logistic regression.

Figure 7. Percentage of *AmED ever users* who were current users of AmED, by significant covariate (n=493)

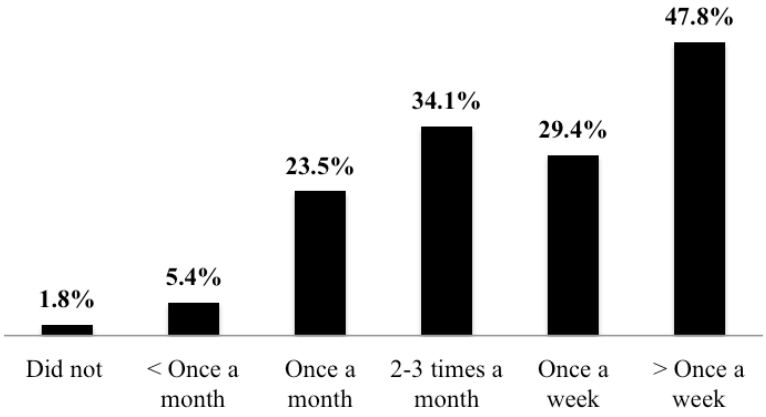
AmED current use by *Ethnicity*



AmED current use by *Sleep time*



AmED current use by *Binge drinking*



Additional information on susceptibility was also collected for *AmED never users*, as shown in Table 11. There was decreased reporting from 'definitely not susceptible' to 'definitely yes susceptible', from higher reported prevalence of 'definitely not' to lower prevalence of 'definitely yes'. Only 1.4% of *AmED never users* reported they would definitely be interested in trying AmED in the future and 1.6% would drink AmED if offered it by a best friend. Approximately three quarters of *AmED never users* responded 'probably not' or 'definitely not' to both questions of *AmED susceptibility*. A nine point susceptibility index, shown in Table 12 and based on point values for each response option, where zero is 'definitely not' and four is 'definitely yes', indicates that just over 40% are not susceptible at all, and 60% of *AmED never users* are susceptible to varying degrees.

Table 11. *AmED Susceptibility* among *AmED never users* (n=1484)

Outcome	Interested in trying AmED in the future		Would drink AmED if offered it by a best friend	
	% (n)		% (n)	
Definitely not	54.1	(799)	45.0	(665)
Probably not	23.0	(340)	24.6	(363)
Not sure	14.2	(209)	16.6	(246)
Probably yes	7.3	(108)	12.2	(181)
Definitely yes	1.4	(20)	1.6	(23)

Table 12. *Susceptibility index* among *AmED never users* (n=1484)

Value	All respondents	
	% (n)	
0	42.1	(621)
1	11.4	(168)
2	14.7	(217)
3	9.4	(138)
4	11.0	(162)
5	4.6	(68)
6	5.1	(75)
7	0.9	(13)
8	0.9	(13)

*Where susceptibility index is the sum of response values from susceptibility questions.

5.5 AmED Types

The next three tables present logistic regressions that were each fitted to examine correlates of *AmED Type 1: pre-mixed, AmED Type 2: bartender served* and *AmED Type 3: self-mixed* among *AmED ever users* (see Tables 13, 14 and 15).

For the outcome *AmED Type 1: pre-mixed*, respondents in British Columbia, and Alberta, Saskatchewan and Manitoba were more likely than respondents in Quebec and Ontario to have

had *AmED Type 1: pre-mixed* among *AmED ever users.* Respondents who reported having *Trouble staying awake* 'most of' or 'all of the time' were more likely to have a *pre-mixed AmED* than those who 'never', 'rarely', or 'sometimes' have trouble staying awake. *Maternal education* was also associated with drinking *pre-mixed AmEDs:* respondents whose mother had education of 'high school or less' were more likely to have had a *pre-mixed AmED* than those whose mother had 'some additional training' (OR=1.8) or 'higher education' (OR=2.3). Reported *Binge drinking* of 'once a week' or 'more than once a week' was associated with reporting consumption of *pre-mixed AmED* compared to those who 'did not' binge drink in the past twelve months or reported binge drinking up to 'two to three times a month'.

Table 13. Estimates from a logistic regression model for *AmED Type 1: pre-mixed* among *AmED ever users* (n=497)

Characteristics	B	S.E.	Wald X^2	OR	95% CI	P value
Gender	-0.19	0.23	0.70	0.82	0.52-1.30	.404
Age			1.51			.681
Ethnicity	0.32	0.28	1.37	1.38	0.81-2.37	.242
Province			13.27			**.010**
BC vs. AB, SK, MB	-0.01	0.36	<.001	0.99	0.49-2.02	.983
BC vs. ON	-0.66	0.33	3.90	0.52	0.27-1.00	.048
BC vs. QC	-0.89	0.32	7.67	0.41	0.22-0.77	.006
BC vs. Mar. & Ter.	-0.18	0.53	0.11	0.84	0.30-2.35	.739
AB, SK, MB vs. ON	-0.65	0.33	4.01	0.52	0.28-0.99	.045
AB, SK, MB vs. QC	-0.88	0.31	8.21	0.41	0.23-0.76	.004
AB, SK, MB vs. Mar. & Ter.	-0.17	0.51	0.11	0.85	0.31-2.30	.743
ON vs. QC	-0.23	0.28	0.69	0.79	0.46-1.37	.405
ON vs. Mar. & Ter.	0.48	0.49	0.97	1.62	0.62-4.26	.326
QC vs. Mar. & Ter.	0.71	0.48	2.19	2.04	0.79-5.27	.139
BMI			2.04			.728
Sleep time			1.94			.585
Trouble staying awake			14.34			**.001**
Never/rarely vs. Sometimes	-0.47	0.23	4.31	0.62	0.40-0.97	.038
Never/rarely vs. Most of/all of the time	0.67	0.32	4.53	1.96	1.06-3.63	.033
Sometimes vs. Most of/all of the time	1.14	0.31	13.60	3.14	1.71-5.77	<.001
School grades			0.50			.992

Characteristics	B	S.E.	Wald X^2	OR	95% CI	P value
Maternal education			11.13			**.011**
High school or less vs. Some additional training	-0.58	0.26	5.00	0.56	0.33-0.93	.025
High school or less vs. Higher education	-0.85	0.26	10.32	0.43	0.26-0.72	.001
High school or less vs. Not reported	-0.21	0.60	0.12	0.81	0.25-2.61	.727
Some additional training vs. Higher education	-0.26	0.27	0.95	0.77	0.45-1.30	.329
Some additional training vs. Not reported	0.38	0.60	0.40	1.46	0.45-4.69	.529
Higher education vs. Not reported	0.64	0.60	1.12	1.89	0.58-6.17	.290
Spending money			3.88			.422
Sensation-seeking	0.07	0.04	2.80	1.08	0.99-1.18	.094
Binge Drinking			17.31			**.004**
Did not vs. < Once a month	0.45	0.40	1.40	1.57	0.75-3.29	.237
Did not vs. Once a month	0.20	0.43	0.20	1.22	0.52-2.84	.654
Did not vs. 2-3 times a month	0.63	0.42	2.28	1.89	0.83-4.30	.131
Did not vs. Once a week	1.40	0.48	8.61	4.05	1.59-10.31	.003
Did not vs. > Once a week	1.72	0.60	8.31	5.57	1.73-17.92	.004
< Once a month vs. Once a month	-0.25	0.31	0.68	0.78	0.43-1.42	.410
< Once a month vs. 2-3 times a month	0.19	0.30	0.40	1.21	0.68-2.15	.528
< Once a month vs. Once a week	0.95	0.37	6.68	2.59	1.26-5.32	.010
< Once a month vs. > Once a week	1.27	0.51	6.11	3.56	1.30-9.74	.013
Once a month vs. 2-3 times a month	0.44	0.34	1.65	1.55	0.79-3.04	.199
Once a month vs. Once a week	1.20	0.41	8.86	3.33	1.51-7.37	.003
Once a month vs. > Once a week	1.52	0.54	7.85	4.59	1.58-13.32	.005
2-3 times a month vs. Once a week	0.76	0.39	3.86	2.15	1.00-4.60	.049
2-3 times a month vs. > Once a week	1.08	0.53	4.14	2.96	1.04-8.39	.042
Once a week vs. > Once a week	0.32	0.57	0.31	1.38	0.45-4.22	.576

*Model: chi-square: 81.1 p<.001; Nagelkerke R^2=.205
*The variable listed first is the reference
*Pairwise contrasts within variables are not shown for Gender, Age, Ethnicity, BMI, Sleep time, School grades, Spending money and Sensation-seeking given that the overall effect of these variables was not significant.

Figure 8 shows the bivariate associations between *AmED Type 1: pre-mixed* among *AmED ever users* and each of the variables significantly associated with this outcome in the logistic regression.

Figure 8. Percentage of *AmED ever users* who reported *AmED Type 1: pre-mixed*, by significant covariate (n=598)

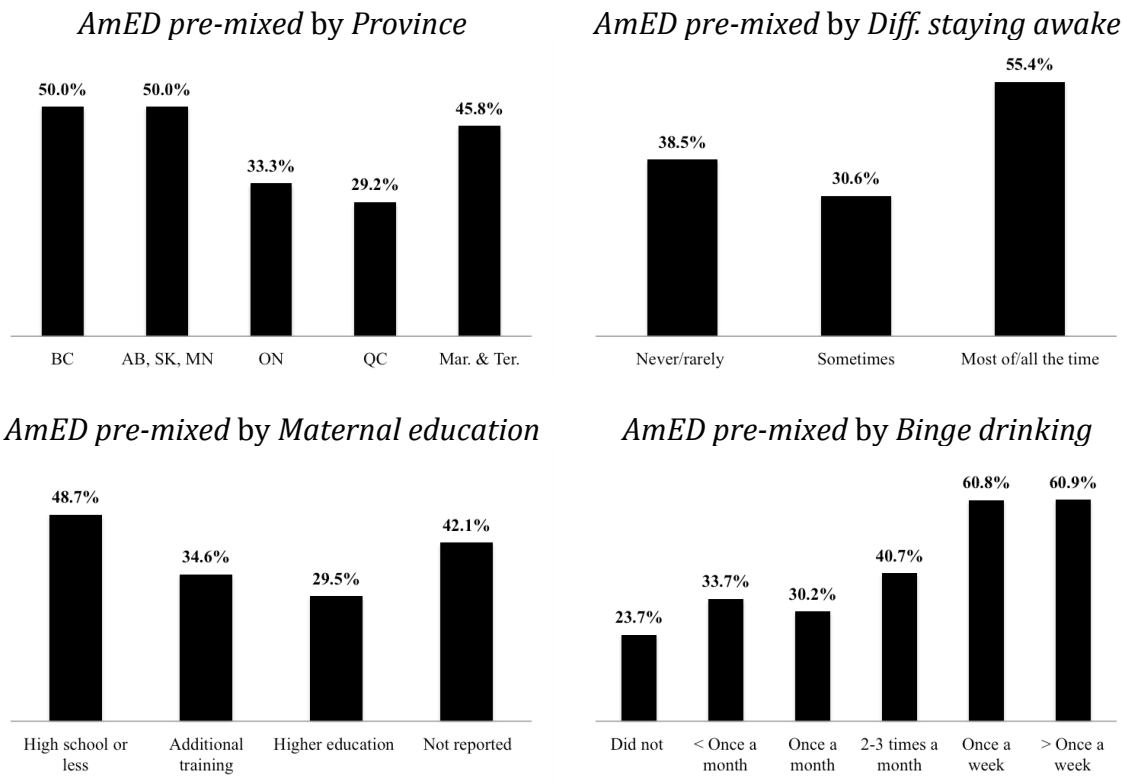


Table 14 shows correlates of *AmED Type 2: bartender served* among *AmED ever users.* Older respondents were more likely than fifteen to seventeen year olds to have had *AmED Type 2: bartender served. Spending money* and *Binge drinking* were also correlated with having AmED served by a bartender. Respondents who reported *Spending money* greater than twenty-one dollars were more likely than those with no spending money, or who did not report spending money to have had AmED served by a bartender. Respondents who reported any *Binge drinking* were more likely to have had AmED served by a bartender than those who 'did not' binge drink in the last twelve months, as did respondents who reported 'two to three times a month' compared to those who reported 'less than once a month'.

Table 14. Estimates from a logistic regression model for *AmED Type 2: bartender served* among *AmED ever users* (n=497)

Characteristics	B	S.E.	Wald X^2	OR	95% CI	P value
Gender	-0.24	0.24	0.98	0.79	0.49-1.27	.321
Age			47.33			**<.001**
12-14 vs. 15-17	-1.10	1.28	0.74	0.33	0.03-4.07	.390
12-14 vs. 18-20	1.27	1.26	1.01	3.56	0.30-41.97	.314
12-14 vs. 21-24	1.59	1.24	1.64	4.91	0.43-56.23	.201
15-17 vs. 18-20	2.37	0.43	29.73	10.65	4.55-24.93	<.001
15-17 vs. 21-24	2.69	0.39	46.73	14.72	6.81-31.82	<.001
18-20 vs. 21-24	0.32	0.26	1.52	1.38	0.83-2.31	.217
Ethnicity	-0.01	0.28	<.001	1.00	0.57-1.74	.995
Province			3.57			.467
BMI			5.04			.284
Sleep time			3.26			.353
Trouble staying awake			0.14			.932
School grades			3.21			.667
Maternal education			0.40			.941
Spending money			20.73			**<.001**
$0 vs. $1-$20	1.08	0.48	4.95	2.94	1.14-7.58	.026
$0 vs. $21-$100	1.02	0.39	6.85	2.76	1.29-5.92	.009
$0 vs. >$100	1.35	0.36	13.80	3.87	1.90-7.92	<.001
$0 vs. Not reported	0.17	0.44	0.16	1.19	0.50-2.81	.691
$1-$20 vs. $21-$100	-0.06	0.42	0.02	0.94	0.41-2.15	.885
$1-$20 vs. >$100	0.28	0.40	0.47	1.32	0.60-2.91	.493
$1-$20 vs. Not reported	-0.90	0.47	3.67	0.41	0.16-1.02	.055
$21-$100 vs. >$100	0.34	0.29	1.39	1.40	0.80-2.46	.238
$21-$100 vs. Not reported	-0.84	0.38	5.03	0.43	0.21-0.90	.025
>$100 vs. Not reported	-1.18	0.35	11.29	0.31	0.15-0.61	.001
Sensation-seeking	-0.07	0.05	1.92	0.94	0.86-1.03	.165
Binge Drinking			13.72			**.018**
Did not vs. < Once a month	0.75	0.36	4.25	2.11	1.04-4.30	.039
Did not vs. Once a month	1.19	0.43	7.63	3.29	1.41-7.67	.006
Did not vs. 2-3 times a month	1.39	0.43	10.69	4.01	1.74-9.23	.001
Did not vs. Once a week	1.43	0.51	8.06	4.19	1.56-11.26	.005
Did not vs. > Once a week	1.17	0.61	3.65	3.27	0.97-10.73	.056
< Once a month vs. Once a month	0.44	0.33	1.86	1.56	0.82-2.95	.173
< Once a month vs. 2-3 times a month	0.64	0.32	3.93	1.90	1.01-3.59	.048
< Once a month vs. Once a week	0.69	0.42	2.69	1.98	0.87-4.50	.101
< Once a month vs. > Once a week	0.42	0.55	0.60	1.53	0.52-4.46	.438
Once a month vs. 2-3 times a month	0.20	0.38	0.28	1.22	0.58-2.55	.598
Once a month vs. Once a week	0.24	0.46	0.28	1.27	0.52-3.12	.599
Once a month vs. > Once a week	-0.02	0.58	0.01	0.98	0.32-3.04	.972
2-3 times a month vs. Once a week	0.04	0.45	0.01	1.04	0.43-2.52	.924
2-3 times a month vs. > Once a week	-0.22	0.58	0.14	0.80	0.26-2.48	.704
Once a week vs. > Once a week	-0.26	0.63	0.17	0.77	0.22-2.66	.680

*Model: chi-square: 125.9 p<.001; Nagelkerke R^2=.306

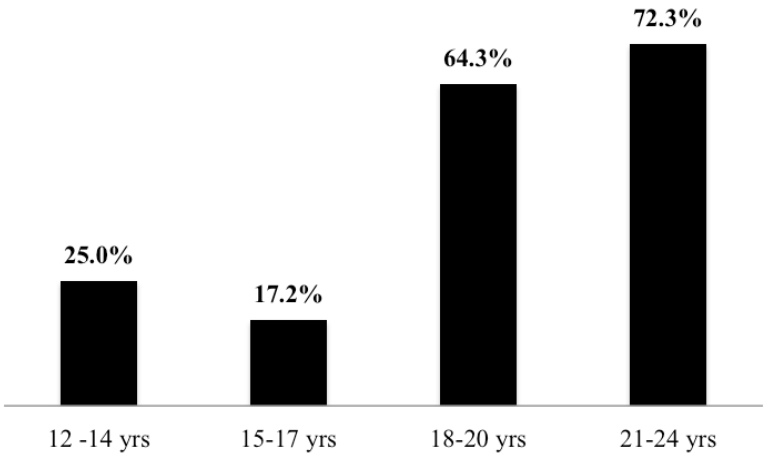
*The variable listed first is the reference

*Pairwise contrasts within variables are not shown for Gender, Ethnicity, Province, BMI, Sleep time, Trouble staying awake, School grades, Maternal education and Sensation-seeking given that the overall effect of these variables was not significant.

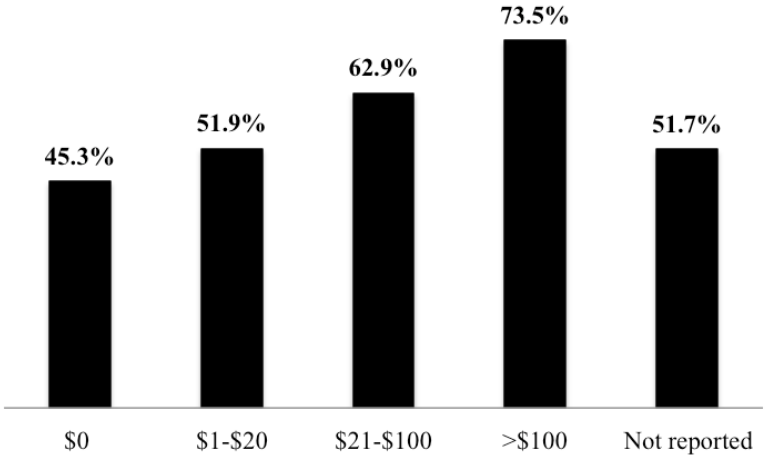
Figure 9 shows the bivariate associations between *AmED Type 2: bartender served* among *AmED ever users* and each of the variables significantly associated with this outcome in the logistic regression.

Figure 9. Percentage of *AmED ever users* who reported *AmED Type 2: bartender served*, by significant covariate (n=498)

AmED served by bartender by *Age*



AmED served by bartender by *Spending money*



AmED served by bartender by *Binge drinking*

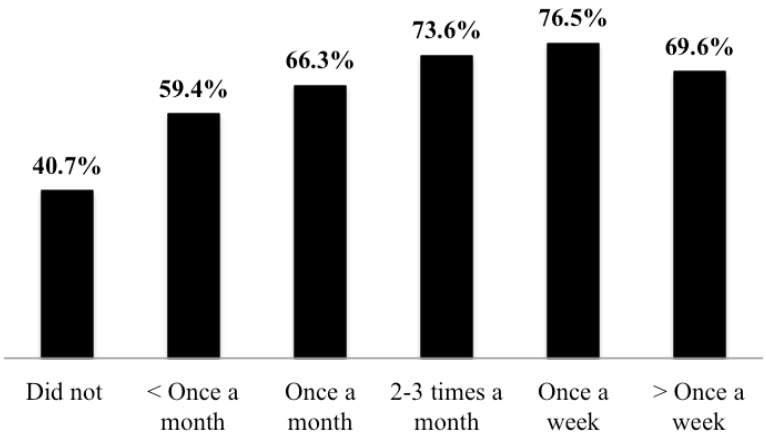


Table 15 shows correlates of *AmED Type 3: self-mixed AmED* among *AmED ever users. Age* was the only significant covariate for having had a self-mixed AmED. Younger youth, aged fifteen to seventeen were approximately two and a half times more likely than young adults eighteen to twenty years old (OR=2.5) and twenty one to twenty four years old (OR=2.3) to have a self-mixed AmED.

Table 15. Estimates from a logistic regression model for *AmED Type 3: self-mixed* among *AmED ever users* (n=497)

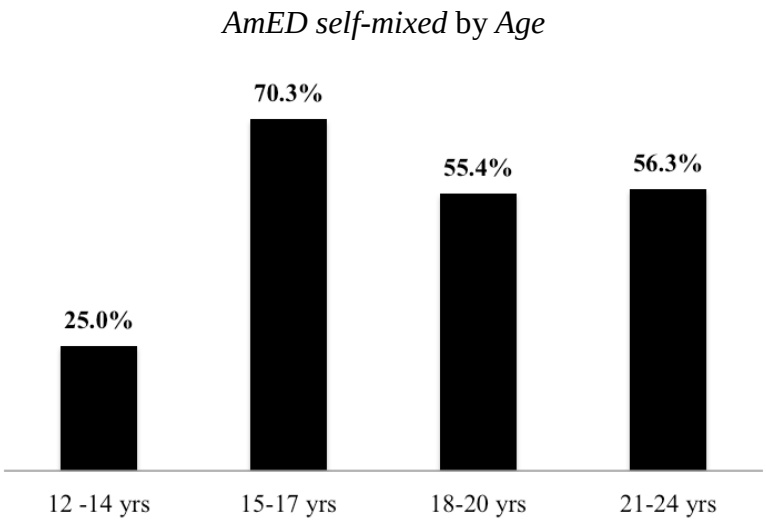
Characteristics	B	S.E.	Wald X^2	OR	95% CI	P value
Gender	0.02	0.22	0.01	1.02	0.67-1.57	.912
Age			8.10			**.044**
12-14 vs. 15-17	2.00	1.26	2.52	7.39	0.63-87-43	.112
12-14 vs. 18-20	1.07	1.26	0.73	2.93	0.25-34.57	.394
12-14 vs. 21-24	1.18	1.25	0.90	3.27	0.28-37.52	.342
15-17 vs. 18-20	-0.93	0.38	6.01	0.40	0.19-0.83	.014
15-17 vs. 21-24	-0.82	0.33	6.01	0.44	0.23-0.85	.014
18-20 vs. 21-24	0.11	0.24	0.21	1.12	0.70-1.79	.648
Ethnicity	0.14	0.26	0.30	1.15	0.70-1.91	.585
Province			7.07			.132
BMI			1.88			.758
Sleep time			1.73			.630
Trouble staying awake			4.66			.097

Characteristics	B	S.E.	Wald X^2	OR	95% CI	P value
School grades			3.27			.659
Maternal education			7.57			.056
Spending money			1.21			.876
Sensation-seeking	0.02	0.04	0.20	1.02	0.94-1.11	.656
Binge Drinking			8.08			.152

*Model: chi-square: 45.2 p<.001; Nagelkerke R^2=.117
*The variable listed first is the reference
*Pairwise contrasts within variables are not shown for Gender, Ethnicity, Province, BMI, Sleep time, Trouble staying awake, School grades, Maternal education, Spending money, Sensation-seeking and Binge drinking given that the overall effect of these variables was not significant.

Figure 10 shows the bivariate associations between *AmED Type 3: self-mixed* among *AmED ever users* and the one variable significantly associated with this outcome in the logistic regression.

Figure 10. Percentage of *AmED ever users* who reported *AmED Type 3: self-mixed,* by significant covariate (n=498)



5.6 AmED Locations of Use

Table 16 reports the frequency of having AmED among *AmED ever users* at eight different locations. The *Locations of use* 'At a bar, pub or nightclub', 'At someone else's house' and 'At

home' were more frequently reported compared to other possible locations. 'At a bar, pub or nightclub' was reported more than twice as often as the third most frequently reported location 'At home'. Few *AmED ever users* had AmED 'at school', 'at work', 'outdoors' or 'while driving'.

Table 16. Locations of AmED use among *AmED ever users* (n=498)

Locations of Use	**AmED ever users** % (n)	
At a bar, pub or nightclub	69.7	(347)
At someone else's house	57.6	(287)
At home	30.5	(152)
At a restaurant	9.6	(48)
At school	4.6	(23)
At work	2.8	(14)
Outdoors	1.4	(7)
While driving	1.4	(7)

In total, 70.8% (n=351) of respondents had AmED at a 'Food or drink establishment' (either or both of 'a bar, pub or nightclub' or 'at a restaurant') among *AmED ever users* (n=498). A logistic regression was fitted to examine correlates of *AmED Location: Food or Drink Establishment* among *AmED ever users* (see Table 17). In general, young adults were more likely to have AmED at a 'Food or drink establishment' when compared to younger age groups. Respondents who reported *Maternal education* as 'higher education' were twice as likely to have AmED at a 'Food or drink establishment' compared to those who reported 'high school or less' and almost three times as likely than those who reported 'some additional training'. Those who reported any *Spending money* were on average three and a half times more likely to have AmED at a 'Food or drink establishment' compared to those who reported having no spending money or 'not reported'.

Table 17. Estimates from a logistic regression model for *AmED Location: Food or Drink Establishment* among *AmED ever users* (n=495)

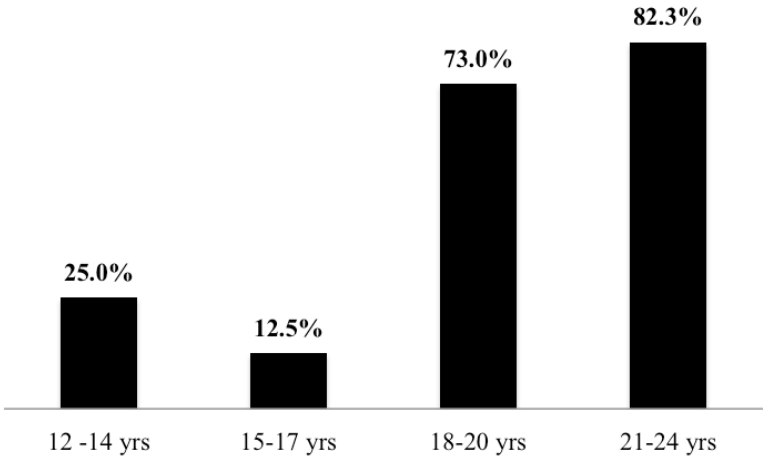
Characteristics	B	S.E.	Wald X^2	OR	95% CI	P value
Gender	0.01	0.29	0.01	1.01	0.58-1.79	.964
Age			71.801			**<.001**
12-14 vs. 15-17	-1.25	1.34	0.88	0.29	0.02-3.92	.349
12-14 vs. 18-20	2.03	1.32	2.37	7.62	0.57-101.06	.124
12-14 vs. 21-24	2.70	1.30	4.31	14.93	1.16-191.85	.038
15-17 vs. 18-20	3.28	0.50	42.47	26.58	9.92-71.29	<.001
15-17 vs. 21-24	3.95	0.47	70.34	52.12	20.69-131.28	<.001
18-20 vs. 21-24	0.67	0.30	4.91	1.96	1.08-3.56	.027
Ethnicity	-0.09	0.34	0.07	0.92	0.47-1.77	.791
Province			9.03			.060
BMI			3.13			.536
Sleep time			2.77			.428
Trouble staying awake			0.75			.688
School grades			10.86			.054
Maternal education			9.56			**.023**
High school or less vs. Some additional training	-0.33	0.32	1.04	0.72	0.39-1.35	.307
High school or less vs. Higher education	0.70	0.34	4.12	2.00	1.02-3.92	.042
High school or less vs. Not reported	-0.08	0.66	0.02	0.92	0.26-3.32	.898
Some additional training vs. Higher education	1.02	0.33	9.35	2.77	1.44-5.33	.002
Some additional training vs. Not reported	0.24	0.66	0.14	1.27	0.35-4.61	.713
Higher education vs. Not reported	-.078	0.67	1.35	0.46	0.12-1.71	.245
Spending money			15.68			**.003**
$0 vs. $1-$20	1.44	0.58	6.17	4.24	1.36-13.23	.013
$0 vs. $21-$100	0.94	0.44	4.53	2.56	1.08-6.07	.033
$0 vs. >$100	1.37	0.42	10.63	3.93	1.73-8.95	.001
$0 vs. Not reported	0.24	0.49	0.24	1.28	0.49-3.36	.622
$1-$20 vs. $21-$100	-0.51	0.52	0.95	0.60	0.22-1.66	.329
$1-$20 vs. >$100	-0.08	0.50	0.02	0.93	0.35-2.48	.881
$1-$20 vs. Not reported	-1.20	0.57	4.37	0.30	0.10-0.93	.037
$21-$100 vs. >$100	0.43	0.34	1.61	1.54	0.79-2.98	.204
$21-$100 vs. Not reported	-0.70	0.43	2.62	0.50	0.22-1.16	.106
>$100 vs. Not reported	-1.13	0.41	7.62	0.33	0.15-0.72	.006
Sensation-seeking	-0.07	0.05	1.41	0.94	0.84-1.04	.235
Binge Drinking			8.47			.132

*Model: chi-square: 185.6 p<.001; Nagelkerke R^2=.446
*The variable listed first is the reference
*Pairwise contrasts within variables are not shown for Gender, Ethnicity, Province, BMI, Sleep time, Trouble staying awake, School grades, Sensation-seeking and Binge drinking given that the overall effect of these variables was not significant.

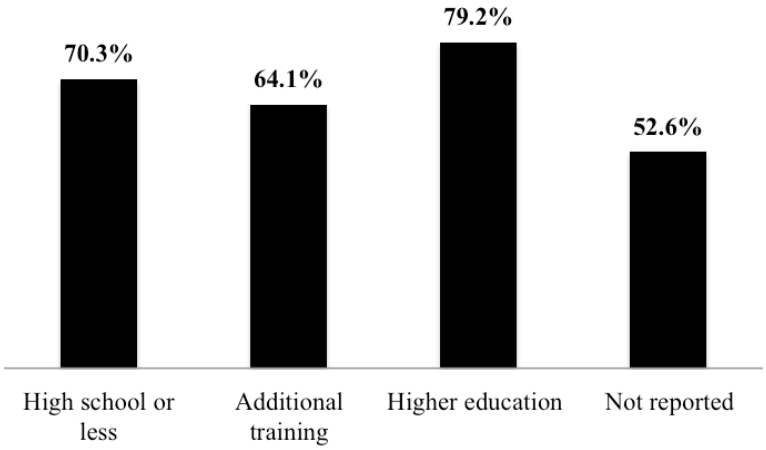
Figure 11 shows the bivariate associations between *AmED Location: Food or Drink Establishment* among *AmED ever users* and each of the variables significantly associated with this outcome in the logistic regression.

Figure 11. Percentage of *AmED ever users* who reported *AmED Location: Food or Drink Establishment*, by significant covariate (n=496)

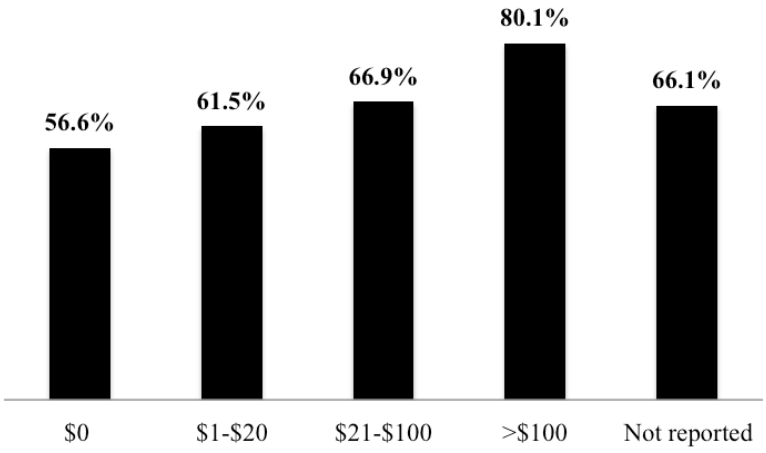
AmED location of use: Food or drink establishment by *Age*



AmED location of use: Food or drink establishment by *Maternal education*



AmED location of use: Food or drink establishment by *Spending money*



5.7 AmED Reasons for Use

Table 18 shows the list of reported reasons for AmED use among *AmED ever users*. The most frequently reported reason for AmED use was 'to get drunk' (51.9%) followed by 'for the taste' (47.3%). The top seven reasons for use were all reported by over a quarter of *AmED ever users*.

Table 18. Reasons for AmED use among *AmED ever users* (n=499)

Reasons for Use	**AmED ever users** % (n)	
To get drunk	51.9	(259)
For the taste	47.3	(236)
Someone offered it to me	40.3	(201)
Curious/Try something new	36.3	(181)
Because my friends were drinking them	29.7	(148)
To boost energy	29.1	(145)
To stay awake	26.7	(113)
To be able to drink more	11.2	(56)
To avoid a hangover	4.2	(21)
To stay alert for driving	2.8	(14)

In total, 54.9% (n=273) of respondents had AmED for 'intoxication' reasons ('to get drunk' and/or 'to be able to drink more') among *AmED ever users* (n=497). Among *AmED ever users* (n=497), 38.8% (n=193) of respondents had AmED for 'energy' reasons ('to stay awake' and/or 'to boost energy'). 'Peer influence' ('someone offered it to me' and/or 'because my friends were drinking them') was reported by 48.1% (n=239) of respondents who had ever had AmED (n=497).

A logistic regression was fitted to examine correlates of *AmED Reasons for Use: Intoxication* among *AmED ever users* (see Table 19). *Province* was a significant covariate. Respondents in British Columbia were more likely than respondents from all other regions in Canada to report having AmED 'to get drunk' or 'be able to drink more'; they were six times more likely than in the Maritimes and Territories. *Binge drinking* was also strongly associated with *Intoxication*; participants who reported 'two to three times a month' were two to three and a half times more likely than respondents who reported 'did not' binge drink in the last twelve months, 'less than once a month' or 'once a month'.

Table 19. Estimates from a logistic regression model for *AmED Reasons for Use: Intoxication* among *AmED ever users* (n=496)

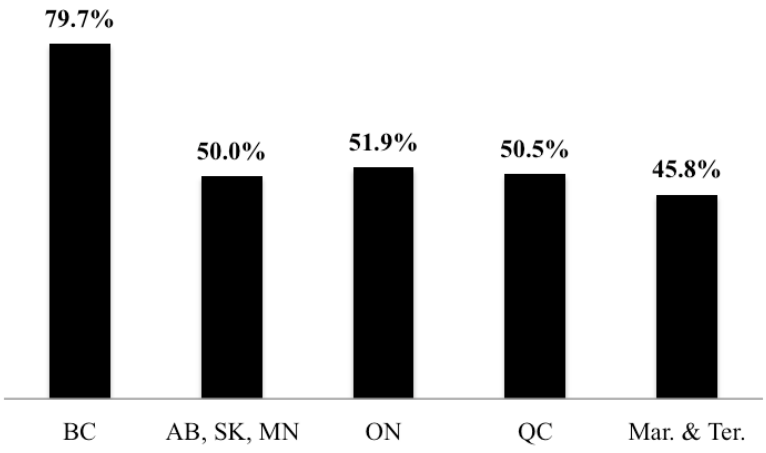
Characteristics	B	S.E.	Wald X^2	OR	95% CI	P value
Gender	0.16	0.23	0.49	1.17	0.75-1.83	.483
Age			7.16			.067
Ethnicity	-0.13	0.27	0.25	0.88	0.52-1.48	.620
Province			19.751			**.001**
BC vs. AB, SK, MB	-1.54	0.41	14.29	0.21	0.10-0.48	<.001
BC vs. ON	-1.48	0.38	15.35	0.23	0.11-0.48	<.001
BC vs. QC	-1.43	0.36	15.41	0.24	0.12-0.49	<.001
BC vs. Mar. & Ter.	-1.81	0.56	10.63	0.16	0.06-0.49	.001
AB, SK, MB vs. ON	0.07	0.32	0.04	1.07	0.57-2.01	.836
AB, SK, MB vs. QC	0.12	0.31	0.14	1.12	0.62-2.04	.705
AB, SK, MB vs. Mar. & Ter.	-0.27	0.51	0.28	0.76	0.28-2.08	.598
ON vs. QC	0.05	0.27	0.03	1.05	0.63-1.76	.853
ON vs. Mar. & Ter.	-0.34	0.49	0.48	0.71	0.28-1.85	.489
QC vs. Mar. & Ter.	-0.39	0.48	0.65	0.68	0.27-1.73	.420
BMI			2.42			.658
Sleep time			0.07			.996
Trouble staying awake			0.22			.896
School grades			10.88			.054
Maternal education			0.80			.849
Spending money			8.44			.077
Sensation-seeking	0.06	0.04	1.82	1.06	0.97-1.16	.178
Binge Drinking			17.87			**.003**
Did not vs. < Once a month	0.19	0.34	0.30	1.21	0.62-2.35	.584
Did not vs. Once a month	-0.10	0.40	0.06	0.90	0.41-1,.97	.801
Did not vs. 2-3 times a month	1.15	0.41	7.98	3.15	1.42-6.99	.005
Did not vs. Once a week	0.92	0.47	3.77	2.50	0.99-6.31	.052
Did not vs. > Once a week	0.60	0.59	1.03	1.82	0.57-5.80	.311
< Once a month vs. Once a month	-0.29	0.29	0.98	0.75	0.42-1.33	.323
< Once a month vs. 2-3 times a month	0.96	0.31	9.71	2.62	1.43-4.79	.002
< Once a month vs. Once a week	0.73	0.39	3.56	2.07	0.97-4.43	.059
< Once a month vs. > Once a week	0.41	0.52	0.62	1.51	0.54-4.22	.432
Once a month vs. 2-3 times a month	1.25	0.35	12.47	3.49	1.74-6.97	<.001
Once a month vs. Once a week	1.02	0.42	5.91	2.77	1.22-6.28	.015
Once a month vs. > Once a week	0.70	0.55	1.63	2.01	0.69-5.90	.202
2-3 times a month vs. Once a week	-0.23	0.43	0.29	0.79	0.34-1.84	.590
2-3 times a month vs. > Once a week	-0.55	0.56	0.95	0.58	0.19-1.74	.329
Once a week vs. > Once a week	-0.32	0.61	0.27	0.73	0.22-2.39	.600

*Model: chi-square: 95.6 p<.001; Nagelkerke R^2=.235
*The variable listed first is the reference
*Pairwise contrasts within variables are not shown for Gender, Age, Ethnicity, BMI, Sleep time, Trouble staying awake, School grades, Maternal education, Spending money and Sensation-seeking given that the overall effect of these variables was not significant.

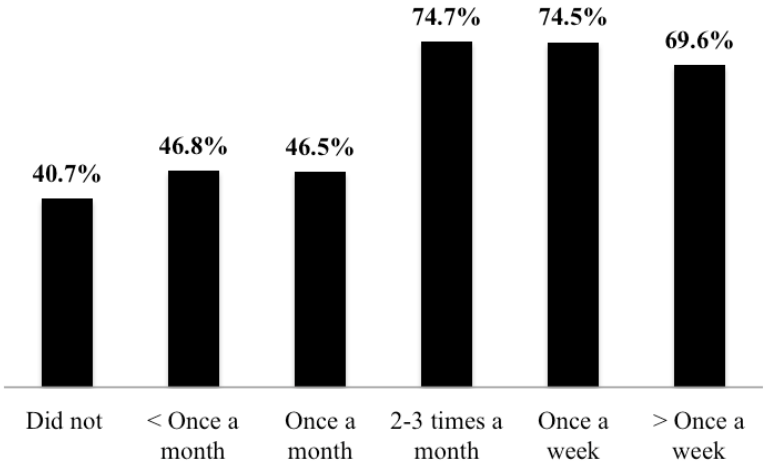
Figure 12 shows the bivariate associations between *AmED Reasons for Use: Intoxication* among *AmED ever users* and the two variables significantly associated with this outcome in the logistic regression.

Figure 12. Percentage of *AmED ever users* who reported *AmED Reasons for Use: Intoxication*, by significant covariate (n=497)

AmED reason of use: Intoxication by *Province*



AmED reason of use: Intoxication by *Binge drinking*



Another logistic regression was fitted to examine correlates of the second most reported *AmED Reasons for Use: Energy* among *AmED ever users* (see Table 20). Overall, among *AmED ever users*, those who did not report *Maternal education* were significantly more likely than those who reported any response to use AmED for *Energy*. Greater reported *Binge drinking* also appears to be associated with using AmED for *Energy*; respondent who reported some binger

drinking were more likely than respondents who 'did not' binge drink in the last twelve months, and who reported 'less than once a month'.

Table 20. Estimates from a logistic regression model for *AmED Reasons for Use: Energy* among *AmED ever users* (n=496)

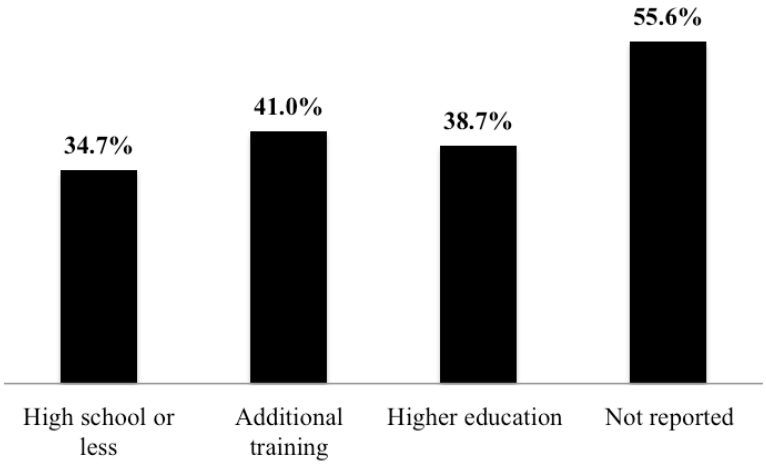
Characteristics	B	S.E.	Wald X^2	OR	95% CI	P value
Gender	-0.10	0.22	0.18	0.91	0.59-1.41	.670
Age			7.28			.063
Ethnicity	0.23	0.27	0.72	1.25	0.74-2.11	.395
Province			0.10			.999
BMI			4.85			.303
Sleep time			1.58			.664
Trouble staying awake			1.10			.577
School grades			6.60			.252
Maternal education			9.35			**.025**
High school or less vs. Some additional training	0.38	0.26	2.09	1.46	0.87-2.44	.149
High school or less vs. Higher education	0.15	0.26	0.34	1.16	0.70-1.93	.560
High school or less vs. Not reported	1.77	0.61	8.50	5.87	1.79-19.30	.004
Some additional training vs. Higher education	-0.23	0.25	0.82	0.80	0.49-1.30	.365
Some additional training vs. Not reported	1.39	0.60	5.38	4.02	1.24-13.02	.020
Higher education vs. Not reported	1.62	0.60	7.18	5.05	1.55-16.50	.007
Spending money			1.19			.880
Sensation-seeking	0.08	0.04	3.57	1.09	1.00-1.18	.059
Binge Drinking			22.72			**<.001**
Did not vs. < Once a month	0.86	0.41	4.48	2.36	1.07-5.21	.034
Did not vs. Once a month	1.13	0.45	6.34	3.10	1.28-7.46	.012
Did not vs. 2-3 times a month	1.45	0.45	10.58	4.28	1.78-10.28	.001
Did not vs. Once a week	2.19	0.50	19.00	8.91	3.33-23.84	<.001
Did not vs. > Once a week	0.94	0.61	2.43	2.57	0.78-8.41	.119
< Once a month vs. Once a month	0.27	0.29	0.90	1.31	0.75-2.31	.343
< Once a month vs. 2-3 times a month	0.60	0.29	4.31	1.82	1.03-3.19	.038
< Once a month vs. Once a week	1.33	0.37	13.25	3.78	1.85-7.74	<.001
< Once a month vs. > Once a week	0.09	0.50	0.03	1.09	0.41-2.88	.863
Once a month vs. 2-3 times a month	0.32	0.32	1.02	1.38	0.74-2.60	.313
Once a month vs. Once a week	1.06	0.39	7.31	2.88	1.34-6.20	.007
Once a month vs. > Once a week	-0.19	0.52	0.13	0.83	0.30-2.30	.719
2-3 times a month vs. Once a week	0.73	0.38	3.67	2.08	0.98-4.41	.055
2-3 times a month vs. > Once a week	-0.51	0.52	0.98	0.60	0.22-1.65	.322
Once a week vs. > Once a week	-1.25	0.56	4.91	0.29	0.10-0.87	.027

*Model: chi-square: 63.8 p<.001; Nagelkerke R^2=.164
*The variable listed first is the reference
*Pairwise contrasts within variables are not shown for Gender, Age, Ethnicity, Province, BMI, Sleep time, Trouble staying awake, School grades, Spending money and Sensation-seeking given that the overall effect of these variables was not significant.

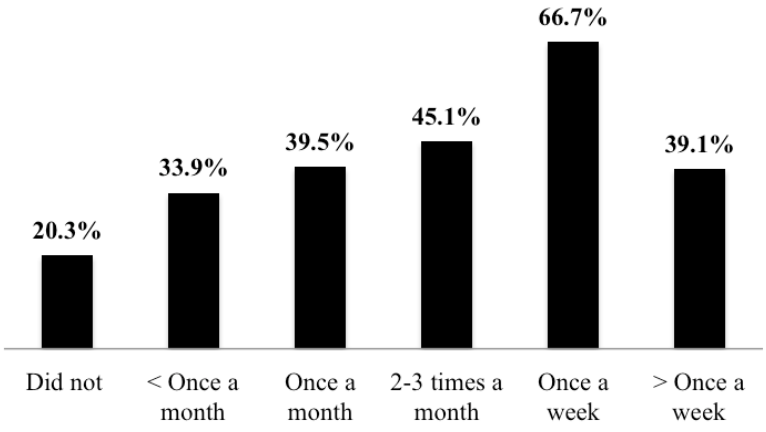
Figure 13 shows the bivariate associations between *AmED Reasons for Use: Energy* among *AmED ever users* and the variables significantly associated with this outcome in the logistic regression.

Figure 13. Percentage of *AmED ever users* who reported *AmED Reasons for Use: Energy*, by significant covariate (n=497)

AmED reason of use: Energy by *Maternal education*



AmED reason of use: Energy by *Binge drinking*



5.8 Risk Behaviour

Table 21 shows the frequencies of reported *Risk behaviours* among *AmED ever users* and *AmED never users*. Sample number varies for each *Risk behaviour* outcome as questions were not asked to all respondents, as outlined in measures for *Risk Behaviour* (section 3.3.4). About twice as many *AmED ever users* reported having a CED to be more alert to drive after drinking alcohol, compared to non-users. Nine times more *AmED ever users* reported having a CED to be more alert to party compared to *AmED never users*. Among those over the age of 15 from the total sample (n=1428), 19% (n=271) reported being in a car with a driver who had been drinking. Over thirty percent of *AmED ever users* report being a car with a driver who had been drinking alcohol; three times more likely than *AmED never users*.

Table 21. *Risk behaviour* among *AmED ever users* and *never users*

Characteristics	After drinking alcohol, ever had CED to be more alert to keep partying or stay out longer		After drinking alcohol, ever had CED to be more alert to drive		In the last 12 months, been in a car when the driver had been drinking alcohol	
	Never users (n=532) % (n)	**Ever users** (n=485) % (n)	**Never users** (n=440) % (n)	**Ever users** (n=472) % (n)	**Never users** (n=937) % (n)	**Ever users** (n=486) % (n)
Yes	3.9 (21)	35.7 (173)	3.0 (13)	5.7 (27)	12.0 (112)	32.5 (159)
No	96.1 (511)	64.3 (312)	97.0 (427)	94.3 (445)	88.0 (825)	67.5 (330)

A logistic regression was fitted to examine correlates of *Risk Behaviour: In car with drinking driver* among *AmED ever users* over the age of fifteen (see Table 22). When examining the *Risk Behaviour: In car with drinking driver, Province, Trouble staying awake* and *Spending money* were significant covariates, as shown in Table 22. Respondents living in British Columbia,

Alberta, Saskatchewan and Manitoba or Quebec, were all more likely to have been in a car with a driver who had been drinking alcohol than respondents in Ontario or the Maritimes and Territories. Those who reported having *Trouble staying awake* 'most of' or 'all the time' were also more likely to report having been in a car with a driver who had been drinking compared to those who only 'sometimes' have trouble staying awake. Respondents who reported having 'over one hundred dollars' in spending money compared to those with $21 to 100$ or 'not reported' were more likely to have been in a car with a driver who had been drinking.

Table 22. Estimates from a logistic regression model for *Risk Behaviour: In car with drinking driver* among all *AmED ever users* over the age of fifteen (n=486)

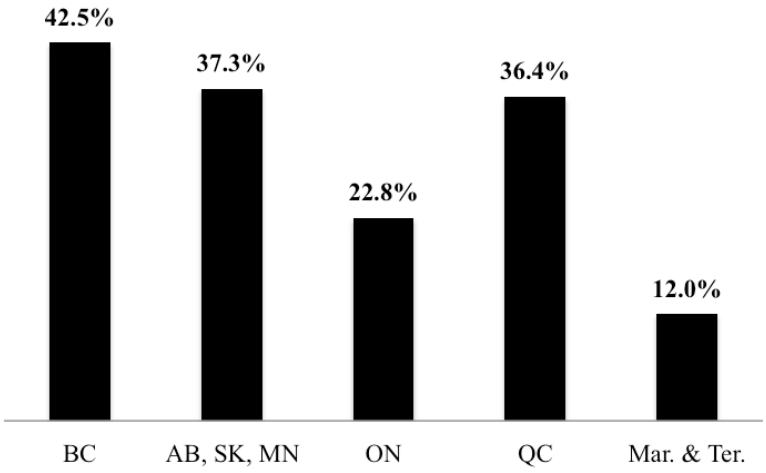
Characteristics	B	S.E.	Wald X^2	OR	95% CI	P value
Gender	0.40	0.24	2.84	1.50	0.94-2.40	.092
Age			3.95			.139
Ethnicity	-0.03	0.29	0.01	0.92	0.55-1.71	.924
Province			13.15			**.011**
BC vs. AB, SK, MB	-0.22	0.38	0.35	0.80	0.38-1.68	.556
BC vs. ON	-0.95	0.36	7.08	0.39	0.19-0.78	.008
BC vs. QC	-0.32	0.33	0.95	0.73	0.39-1.38	.329
BC vs. Mar. & Ter.	-2.00	0.76	6.91	0.14	0.03-0.60	.009
AB, SK, MB vs. ON	-0.73	0.36	4.15	0.48	0.24-0.97	.042
AB, SK, MB vs. QC	-0.09	0.32	0.09	0.91	0.49-1.69	.767
AB, SK, MB vs. Mar. & Ter.	-1.78	0.75	5.60	0.17	0.04-0.74	.018
ON vs. QC	0.63	0.30	4.59	1.88	1.06-3.36	.032
ON vs. Mar. & Ter.	-1.05	0.74	2.02	0.35	0.08-1.49	.156
QC vs. Mar. & Ter.	-1.68	0.72	5.40	0.19	0.05-0.77	.020
BMI			7.74			.102
Sleep time			4.73			.193
Trouble staying awake			6.85			**.033**
Never/rarely vs. Sometimes	-0.32	0.24	1.74	0.73	0.45-1.17	.187
Never/rarely vs. Most of/all of the time	0.53	0.33	2.50	1.70	0.88-3.26	.114
Sometimes vs. Most of/all of the time	0.85	0.33	6.63	2.33	1.22-4.43	.010
School grades			10.56			.061
Maternal education			6.33			.097

Characteristics	B	S.E.	Wald X^2	OR	95% CI	P value
Spending money			9.65			**.047**
$0 vs. $1-$20	-0.59	0.52	1.31	0.55	0.20-1.53	.253
$0 vs. $21-$100	-0.63	0.40	2.45	0.53	0.24-1.17	.117
$0 vs. >$100	0.02	0.37	0.01	1.02	0.50-2.10	.954
$0 vs. Not reported	-0.87	0.50	3.06	0.42	0.16-1.11	.080
$1-$20 vs. $21-$100	-0.04	0.46	0.01	0.96	0.39-2.39	.934
$1-$20 vs. >$100	0.62	0.43	2.03	1.85	0.79-4.31	.155
$1-$20 vs. Not reported	-0.28	0.54	0.26	0.76	0.26-2.20	.610
$21-$100 vs. >$100	0.65	0.28	5.37	1.92	1.11-3.34	.021
$21-$100 vs. Not reported	-0.24	0.43	0.32	0.79	0.34-1.82	.575
>$100 vs. Not reported	-0.89	0.40	5.06	0.41	0.19-0.89	.024
Sensation-seeking	0.02	0.05	0.19	1.02	0.93-1.12	.660
Binge Drinking			7.73			.171

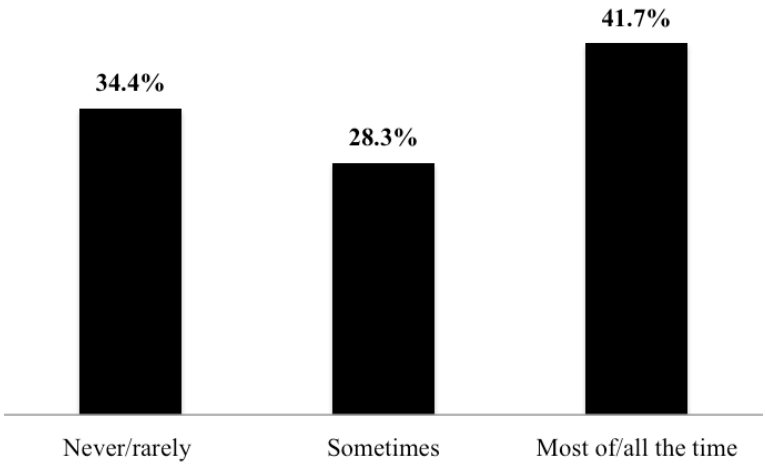
*Model: chi-square: 88.8.2 p<.001; Nagelkerke R^2=.233
*The variable listed first is the reference
*Pairwise contrasts within variables are not shown for Gender, Age, Ethnicity, BMI, Sleep time, School grades, Maternal education, Sensation-seeking and Binge drinking given that the overall effect of these variables was not significant.

Figure 14 shows the bivariate associations between *Risk Behaviour: In car with drinking driver* among *AmED ever users* over the age of fifteen and the variables significantly associated with this outcome in the logistic regression.

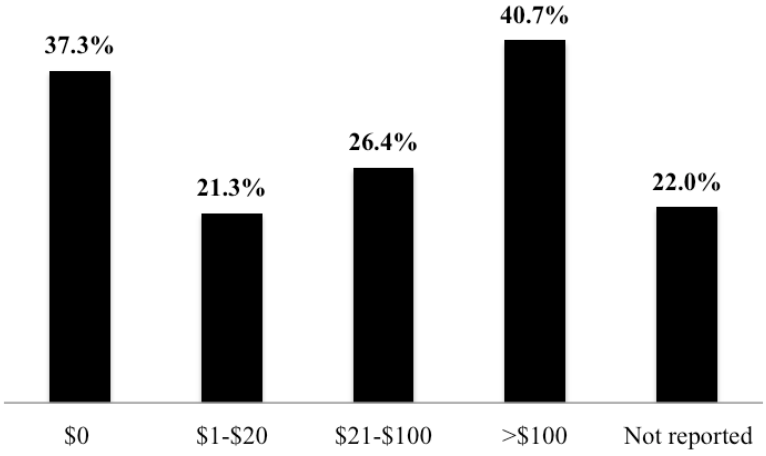
Figure 14. Percentage of *AmED ever users* over fifteen years who reported *Risk Behaviour: In car with drinking driver*, by significant covariate (n=487)



Risk behaviour: In car with drinking driver by *Difficulty staying awake*



Risk behaviour: In car with drinking driver by *Spending money*



6.0 DISCUSSION

The current study is among the most comprehensive surveys of caffeinated energy drink consumption in combination with alcohol among Canadian youth and young adults to date. The primary findings and potential implications for policy are discussed below.

6.1 AmED Awareness

Awareness of AmEDs was high among youth and young adults who had never consumed these drinks. Among who have never had AmED, more than six out of every ten reported having heard of some form of AmED. Just over half had ever heard of mixing alcohol with an energy drink, approximately ten percent fewer had heard of vodka *Red Bull,* and close to a third had ever heard of a *Jägerbomb*. Approximately 10% of respondents who reported 'no awareness' to the general question, subsequently reported awareness of either *Jägerbomb* or vodka *Red Bull*. This suggests that prompting respondents with common brands may increase the accuracy of measures for AmED use and awareness. A German study from 1994 assessed the awareness of CEDs among adolescents and reported that 94% were aware of CEDs.(58) The Consortium Nomisma-Areté questionnaire among three to ten year olds assessed awareness by asking "Have you ever heard about ENERGY DRINKS?"; this question is not AmED specific, nor among the age group of interest.(153) To our knowledge, the current study is the first to report awareness of AmED and to examine the specific socio-demographic covariates among respondents who had never had AmED. Gaining a better understanding of the potential predictors of those that are aware but not yet using AmEDs may help in future policy development to reduce exposure to AmEDs, and thus potential consumption.

6.2 Alcohol Use and Patterns of Consumption

Alcohol consumption was high among youth and young adults surveyed. The majority of respondents reported having had alcohol, though less than half of respondents were of legal drinking age. More than a quarter of all respondents reported consuming alcohol multiple times per month, and almost one out of six reported consuming alcohol on a weekly basis. Over a third of youth reported past year alcohol consumption, and almost eight out of ten young adults reported past year alcohol consumption.

Past year binge drinking was high, reported by 40% of respondents. Among youth seventeen years of age or younger, 15% reported binge drinking in the past year, and that increased to 60% among respondents eighteen and older. Among the subsample of those who have ever used AmED specifically, the greater majority of respondents reported drinking alcohol multiple times per month, and almost 20% reported consuming alcohol multiple times a week. One in ten respondents reported binge drinking multiples times per month, a proportion that increased to almost 35% among AmED ever users.

When compared to high school-based samples, our estimates of past year alcohol consumption are slightly lower. For example, in 2013, half of grade seven to twelve students in Ontario reported past year use, and weekly consumption was reported by more than one out of every ten students.(72,79). Higher rates of alcohol use were reported among a grade seven to eleven sample, where a quarter of respondents reported having had alcohol on a weekly basis in the preceding year.(75) Reported binge drinking rates in the current study are slightly lower than other studies. Findings from the OSDUHS esponses were not weighted 2013 indicated

that 20% of youth reported binge drinking in the past month, a number that reached almost 40% among twelfth graders.(79) When compared to data from the YSS 2012-13, our reported rates of binge drinking are about half that reported among the grade seven to twelve sample.(154)

Patterns of alcohol use among young adults were somewhere in the middle of those reported in other Canadian studies among young adults. In a university sample in Western Canada, close to nine out of ten reported past month alcohol use.(22) Among a college-age population, 65% reported alcohol use of at least once a week in the past year.(75) From the Canada-wide CADUMS survey in 2012, past-year alcohol use among youth and young adults 15 to 24 years of age was only slightly lower than the rate reported in the current study, and one in four reported drinking more than the acute risk guidelines.(154) The reported rates of alcohol use from the current study and others are high, and strategies to lower these rates should be considered.

6.3 AmED Use and Patterns of Consumption

AmED Ever Use and Frequency of Use

Mixing alcohol and energy drinks appears to be common among a relatively young sample of youth and young adults. A quarter of all respondents reported ever having an AmED, and reported AmED use increased with age. Among respondents seventeen and under, 7% reported ever having AmED, a rate that increased to 44% among young adults. The reported rates for lifetime use of AmED were lower than those reported in studies among both youth and young adults.

Lifetime AmED use rates reported in the current study were lower than the rates from the Canada wide YSS and other important Canadian studies. The YSS 2010-2011 reported that one in five students in grades seven to twelve had had a mixed or pre-mixed AmED in the previous twelve months, and one in four students who completed the 2012-2013 YSS had had alcohol and a CED in the previous twelve months.(113,114) Other studies have reported that sixteen to seventeen percent of students reported AmED use at least once in the past year, about double the prevalence of use reported in the current study, with prevalence ranging from 3% among seventh graders to 28% among twelfth graders.(78,79) Given the young age range of this sample and the significant concerns associated with AmED consumption, this prevalence remains cause for concern.

Almost half of the current sample of young adults reported ever having AmED, slightly lower than rates reported from other Canadian surveys. Among respondents fifteen years of age and older, 30% reported past year use of AmED, but this includes older adults who may not have taken interest in the AmED trend.(65) Among university students who were current CED users, close to eight out of ten had ever had AmED, and one out of five had had an AmED in the previous week.(74) This suggests that those who are already consuming or who have consumed a CED are much more likely to mix the beverage with alcohol or have an AmED in another format. Another university-based sample reported that close to a quarter of respondents had had AmED in the month preceding the survey.(22) Reported AmED use in the current survey is also lower than that reported in an American survey of university students between the ages of eighteen and twenty four. Seventy five percent of American young adults reported ever having an AmED, and 65% reported having AmED in the previous year, just over 20% more than was

reported among Canadian young adults from the current study.(106) Most studies among young adults are university based, while respondents from the current study were included regardless of enrolment in an educational institution. Prevalence may be higher among college and university based samples due to a culture of regular drinking and partying that may not be as strong among young adults already in the workforce.

When examining use among all those who reported AmED use in the past, the proportion who consume AmED once a month or more increases to almost 20%; these rates are only slightly lower than those reported from the CADUMS among respondents fifteen years of age and older who had AmED in the past month, and the same as those reported among a university sample only.(22,65) CADUMS is also the only survey to our knowledge to report on the number of beverages per occasion: 51% reported one beverage per occasion, 40% reporting two, and 6% report three or four.(65) Although overall prevalence of use was lower in the current study than in most others in Canada, the current findings contribute to the current body of literature, indicating that AmED use is popular among youth and young adults.

AmED Type

Youth and young adults reported consuming different types of AmEDs in the current study. AmEDs served by a bartender or self-mixed were the most popular format of AmED, although pre-mixed AmEDs and having alcohol and CEDs separately on the same occasion were also frequently reported. No studies to date have examined differences between types of AmEDs consumed, limiting points of comparison for the current study.

Monitoring the types of AmEDs that are consumed can give some indication of how AmEDs are obtained and where they are consumed. The most popular type of AmED was 'served by a bartender'; thus, bars and pubs may be the most popular location to consume AmEDs. Over half of respondents also reported consuming self-mixed AmEDs, which would pose less of a challenge for minors to access so long as they could access alcohol in some form, as CEDs are currently legal to sell to all ages. Interestingly, the current study found that youth were in fact more likely to consume a self-mixed AmED and young adults were more likely to consume AmED served by a bartender.

Based on previous research, obtaining alcohol as a minor is not very challenging; the most common way to obtain alcohol among youth is to be given it by another person, and the second most common way is to give someone money to purchase alcohol.(79) Implementing a ban on the sale of AmEDs in bars and pubs, as well as a ban on the sale of CEDs to minors would address at least a portion of AmED consumption for the most frequently reported types of AmEDs among minors.

Though pre-mixing CEDs and alcohol is illegal, the 'loop hole' in regulation allowing pre-mixed alcoholic beverages to contain caffeine, so long as the caffeine is derived from a naturally containing ingredient, has been sufficient to continue to make these products available for purchase in some form.(136) Some of the reporting of pre-mixed AmEDs may stem from the pre-regulatory changes of December 2013, but given the young age of this sample and the time at which survey data was collected, this number still calls for attention into where and what pre-mixed AmEDs are being purchased in Canada.

To our knowledge, there are no other studies that have examined the differences in consumption rates between types of alcohol mixed with energy drink, or socio-demographic characteristics related specifically to consumption of AmED types.

6.4 AmED Locations of Use

The majority of respondents reported consuming AmEDs in bars, pubs or nightclubs. Consuming AmEDs at someone else's house was also a common setting among respondents. Driving, outdoors, at work and at school were not common locations to drink AmEDs. To our knowledge, this is the first study to examine locations of use of AmEDs.

It is noteworthy that even with a Canada wide ban on pre-mixed AmEDs and a Health Canada regulation stating "Do not mix with alcohol", AmEDs are being consumed most frequently in bars, pubs and nightclubs. This indicates that banning the sale of pre-mixed AmEDs is insufficient to discourage the use of AmEDs in these settings, and that the 'cocktail' of alcohol and CEDs is still being mixed by food and beverage staff. Banning the sale of CEDs entirely from bars, pubs, nightclubs, restaurants, festivals and other events that also sell alcohol may be required to truly limit the mixing of CEDs and alcohol in public locations.

Consuming AmEDs in someone else's house was a popular response for AmED locations of use. One possible explanation for why consumption was so frequently reported is that it may be serving more as a 'party house' than just a location for casual drinking. Given the proportion of respondents who are under the legal drinking age and technically prohibited from entering a bar

or night club, many youth may in fact be consuming AmEDs at house parties. AmEDs are consumed in a number of locations, but appear to be most popular in social settings.

6.5 AmED Reasons for Use

The most commonly reported reason for using AmEDs among youth and young adults in this sample was to get drunk. Just under half reported drinking AmEDs for the taste, because the beverage was offered to them or out of curiosity to try something new. A significant number also reported consuming them because their friends were drinking them too, to boost their energy or to stay awake.

To our knowledge no other Canadian study has examined reasons for drinking AmED; however, some international studies offer a point of comparison. Compared to American studies, the current study reports similar findings. One study reported that half the sample consumed CEDs in order to mix it with alcohol for partying. In another study, 'getting drunk' was the second most important motivation for consuming AmEDs, followed by 'to drink more'.(28,81) Similarly, a survey of American university students, revealed the most common reasons for AmED use were to mask the flavour of alcohol and to be able to drink more.(80) Though non-alcohol related reasons have been reported, the majority of reasons appear to be highly associated with alcohol consumption, specifically with an intention of intoxication.

6.6 Risk Behaviour

AmED users were more likely to have reported risk behaviours. AmED users were much more likely to have a CED in order to be able to party or stay out later, were more likely to have a

CED to be more alert to drive after having consumed alcohol, and more likely to have been in a car with a driver who had been drinking alcohol. The latter two behaviours have important implications for road safety.

The current study found similar rates to the 2013 OSDUHS for being in a vehicle with someone who had been drinking alcohol among students in grades seven to twelve.(79) In a study among university students, AmED users were more likely than non-users to have ridden home with a driver who had been drinking, who had been driven home after drinking, or been hurt or injured.(22)

The impaired driving rate in Canada was on a general decline until 2006, and has since been increasing.(155) In 2011, 90,277 impaired driving incidents were reported in Canada.(155) Twenty to twenty-four olds and sixteen to nineteen year olds have the first and third highest impaired driving rates respectively, the age range of the eldest half of respondents in the current study.(155) With the growing popularity of AmEDs, the perceived benefits of consuming CEDs with alcohol, and the growing number of impaired driving incidents, AmEDs may in fact be contributing added cases of impaired driving to already alarming numbers.

A number of other Canadian studies have also found that AmED users are more likely to express risk behaviour. Among a sample of university students, AmED users were at a greater risk of negative consequences such as drinking and driving, and were more likely to use stimulant drugs (cocaine, crack-cocaine, amphetamines, and crystal meth) compared to non-users.(22) Similar patterns of behaviours and increased substance abuse were observed among a sample of youth as

well; findings indicated cigarette smoking, marijuana use and 'intent to drive after a night out' were higher among AmED users than non-users.(85,116,118) The current study did not assess the risk of substance abuse, but one Canadian study among youth did and reported that one in five students in Canada are at risk of substance abuse, which may place them at an increased risk of AmED use as well.(114) The current study supports the findings from previous studies that serious risk behaviours are more common among AmED users than non-users.

6.7 Socio-Demographic and Behavioural Covariates

6.7.1 Age, Ethnicity, BMI and Gender

Age

Age was consistently associated with most AmED outcomes. As hypothesized, AmED awareness increased with age, which is consistent with minimum age requirements for alcohol use in Canada. However, awareness of AmED began to increase significantly among 15-17 year olds, before the legal drinking ages in Canada.

Age was also significant for two of three AmED types examined, as described previously: youth were more likely to consume a self-mixed AmED and young adults were more likely to consume AmEDs served by a bartender. This difference may be primarily related to environment: those of legal drinking age may be spending more time drinking in bars and restaurants whilst fifteen to seventeen year olds are drinking at house parties and in friends' homes, and cannot access alcohol legally. Reporting greater consumption of self-mixed AmED among a younger population is likely a result of being under the legal drinking age, wanting to drink this type of beverage and having to do so outside of public venues. Since regulations already exist around the

sale of alcohol to minors, additional regulations to limit access to CEDs may be important to help reduce the consumption of this beverage type among youth.

Consuming more alcohol, having AmED served by a bartender, and having AmED while at a food and drink establishment are outcomes that were generally reported by young adults, likely as a result of restrictions on legal drinking age and increased exposure to bars, pubs and nightclubs. The current findings are similar to those of other Canadian studies that reported an association between being older and greater AmED use. OSDUHS found that AmED use increased significantly with school grade.(79) In a study among university students, undergraduate students who lived on campus were more likely to have consumed AmED in the past thirty days than graduate students.(22) Moreover, use of AmED among an older population in restaurants, bars, pubs or nightclubs is expected given respondents would need to be of legal age to be able to order an alcoholic beverage in a food or drink establishment.

Ethnicity

Ethnicity was associated with awareness of AmED and with current use of AmED. Overall, respondents who were 'White' were more likely to be aware of AmED. It appears that no other studies appear to have examined ethnic differences in awareness of AmEDs. It is unclear why this ethnic difference was detected, but may be a result of targeted marketing strategies. On the other hand, respondents of 'non-White' ethnicity were much more likely to be current users of AmEDs. The COMPASS study among grade nine to twelve students in Ontario may be the only other Canadian study to have reported on such a difference, and found that non-'White', 'mixed', and non-Aboriginal ethnicities were associated with past year AmED use.(78) Socio-economic

or environmental differences, such as neighbourhood of residence or parental substance use, may have contributed to this difference, unfortunately, the current study does not include these measures.

Body Mass Index

BMI was associated with awareness of AmED, but no AmED associated behaviours. Awareness was significantly higher among respondents who reported a 'healthy weight' or 'overweight' compared to those who did 'not report' their height and weight. 'Not reported' is typically indicative of a higher BMI.(156) For AmED awareness, no other studies have examined AmED awareness among non-users, so the findings reported for BMI are the first for this outcome. Few international studies and only one Canadian study have examined the association between AmED use and BMI, none found an association between BMI and AmED use.(78,132,157) Because CEDs are a sugar-sweetened beverage, it may be logical to anticipate an association between AmED and a higher BMI, however, it is possible that this association was not found as a result of the growing number of artificially sweetened CEDs available on the market, or because alcohol consumption is more evenly reported across BMIs.

Gender

Gender was not significantly associated with any of the main outcomes of this study. In the current body of literature, some studies have also reported no gender differences; however, many studies have found that males were more likely to consume AmEDs.(22,55,80,118) It is unclear why we did not find similar gender differences in the current study. It is possible that gender differences in AmED use may be decreasing as a result of CED companies increasing marketing

efforts across both genders.(25) More female-targeted AmED products and sugar-free CEDs are now available on the market also.(28,53) In addition, alcohol consumption among young women has been increasing, which may also play a role in levelling the prevalence of AmED consumption between genders.(79) Results from the last OSDUHS in 2013 reported that males and females were equally likely to drink alcohol.(79) Equal attention should be given to both genders when considering approaches to manage AmED consumption.

6.7.2 Sleep

This is the first study to examine patterns of sleep among AmED users. Respondents who reported 'difficulty staying awake' were more likely to consume pre-mixed AmEDs and to have been in a car with a driver who had been drinking. Respondents who did not report sleep time were more likely to report current use of AmED. Amon non-AmED users, respondents who reported shorter sleep times were more likely to be aware of AmED compared to those who reported longer sleep times. There was a large proportion of respondents who did not report sleep time and these may be respondents who have short sleep times, as often 'not reported' is actually skewed in the negative direction of the behaviour examined, thus this finding may have greater implication for the model results. 'Difficulty staying awake' may have been associated with greater likelihood of being in a car with a drinking driver as a result of choosing not to drive on late nights out. If a person has difficulty staying awake, they would chose to have someone else drive in the event of nights 'out' to eliminate the risk of falling asleep at the wheel or risk low reaction time. The danger in choosing not to drive because of fatigue is substituting one risk with another; being in a vehicle with a driver under the influence of alcohol. The association between AmED awareness and sleep time may be explained by the use of CEDs; respondents sleeping

seven hours a night or less may be CED users which in turn may make them more aware of AmEDs.

The challenge with observing sleep time and difficulty staying awake in this population is that many respondents, especially those in the teenage years, may not actually know if they are getting enough sleep, they may not think they are overtired, and they may not be very self-aware.

6.7.3 Province

Province was a significant covariate for ever use of AmED, consumption of pre-mixed AmEDs, consumption of AmEDs for the purpose of intoxication and also in association with risk behaviour. We had hypothesized that ever use and current use of AmED would be higher among respondents in Quebec and the Canadian prairies (Alberta, Saskatchewan and Manitoba) given that three out of four of those provinces have legal drinking ages of 18 rather than 19, the legal drinking age in the rest of Canada. As hypothesized, the prairies were associated with greater ever use of AmED, but also with pre-mixed AmED use and greater risk behaviour. Respondents in British Columbia had a greater likelihood of reporting ever having AmED, having a pre-mixed AmED, having AmED for intoxication purposes and have greater risk behaviour. Respondents from Quebec were more likely to engage in risk behaviours.

Few studies have examined differences between AmED consumption by province. Findings from the 2010-11 YSS found that residents from Newfoundland and Labrador, Prince Edward Island, Quebec, Manitoba and Saskatchewan were less likely to consume AmEDs than residents of Nova Scotia, and that the highest prevalence of AmED use was in BC.(118) Findings for

provinces may be explained by environmental and regulatory differences. BC, AB, SK and MB do not have additional regulations around AmEDs beyond those outlined by Health Canada, though the Manitoba Liquor Control Commission will be conducting a study on the use of energy drinks mixed with alcohol.(139)

Living in BC was a significant covariate for four of ten AmED outcomes, and may indicate greater use and popularity in that province. BC is likely the Canadian province with the greatest opportunities for extreme-sports and high adrenaline activities given the natural geography. CEDs are marketed to adrenaline 'junkies' and extreme sport enthusiasts, so it may be reasonable to assume residents of BC are more exposed to CED advertisements.(16) For example, *Red Bull* sponsors Darren Berrecloth from Qualicum Beach, BC, one of the best free-ride mountain bikers in the world, and has featured him in *You Tube* videos and a number of ads for *Red Bull*.(158) In addition, *Monster Energy* has become the official drink of Whistler Blackcomb since December 2013.(24)

Residing in Quebec was not as significant a covariate for AmED patterns of use as was hypothesized. Since October 2011 a growing number of municipalities have banned the sale of CEDs in municipal buildings, high schools, Cegeps, arenas and sports complexes across the province of Quebec.(43,45) In addition to making CEDs less available to youth and the population as a whole, regulations may also have resulted in increased awareness amongst Quebecers of the potential adverse effects of CEDs contributing to lower AmED use. Some of the approaches to managing CED use in Quebec may help inform further policy development in other provinces and territories, and around AmEDs.

6.7.4 Maternal Education and School Grades

We had hypothesized that among AmED users, being more aware of AmEDs and using AmEDs to become intoxicated would be higher among respondents with lower reported maternal education. The current findings suggest that lower maternal education is associated with consumption of pre-mixed AmEDs, and higher maternal education is associated with having AmED at a food and drink establishment. Respondents who did not report maternal education at all were more likely to consume AmEDs for energy, compared to all others. Unfortunately, without information on the characteristics of those in the 'not reported' category, it remains difficult to speculate on why there was an association between maternal education and reported AmED use for energy. However, as described previously, 'not reported' often indicative of the negative outcome of the behaviour examined, a lower maternal education in this case. Higher maternal education was associated with more frequent AmED use in food and drink establishments. Higher education has an impact on household income, and if a parent has greater income, then it may be that those respondents do not have to maintain part time jobs or work as many hours as their peers for their spending money. Not working or working less would allow more time to 'go out drinking' with friends. It is not clear exactly why maternal education has a significant effect on respondents consuming AmEDs in food and drink establishments. To our knowledge, this is the first study to examine maternal education and AmED outcomes.

We found no significant associations between school grades and any of the main AmED outcomes examined in the current study. We hypothesized that ever having AmED and current use of AmED would be associated with lower school grades. This may indicate that student success, measured as school grades, may not be negatively affected by AmED consumption.

Findings from a nationally representative sample of Canadian youth in grades seven to twelve indicated different findings from the current study; absence from school was associated with increased likelihood of reporting past-year AmED use, and grades over 70% were associated with decreased odds of reporting AmED use.(118) One possible explanation for the current findings is that models included sensation seeking and maternal education, potentially attenuating the effect of grades.

6.7.5 Spending Money

Spending money was less significant than originally hypothesized; spending money was associated with awareness of AmED, having an AmED served by a bartender, having an AmED in a food or drink establishment and risk behaviour. We hypothesized that greater spending money would be associated with ever use of AmED, current AmED use, AmED served by a bartender and consumed in a food and drink establishment, because general AmED use can be costly.

CEDs and alcohol can be relatively expensive, especially in settings where there is an additional product mark-up, such as at a bar. In the instance of AmED served by a bartender, a financial exchange would be required, and the current findings do suggest that weekly spending money of $21 or more would increase likelihood of this. Having little or no money would greatly hinder purchasing power for this type of beverage. If purchasing an AmED is not a possibility for financial reasons, respondents may also have limited exposure to settings where they could potentially purchase these beverages, such as at bars, clubs or liquor stores. Having money may

be connected to being in bars, clubs and liquor stores more often, even if not purchasing AmEDs, and resulting in increased awareness of the products.

Spending money over $100 was associated with greater likelihood of being in a car with a driver who had been drinking. The underlying financial association may stem from being in a social circle where 'friends' have sufficient money to own a vehicle, or where money is needed to drive to and from the venues attended. Respondents who have friends with cars likely have jobs to pay for the vehicle or to pay for gas to drive the vehicle, and the respondents themselves may also have jobs if they share in that similarity with their network of people.

The current findings suggest that spending money is not a barrier to AmED use entirely. If youth and young adults want to drink AmEDs but have limited spending money they will find a way, but the type and location may be limited.

6.7.6 Sensation-Seeking

Sensation-seeking was only associated with one outcome, a greater likelihood of being aware of AmEDs, and no outcomes among AmED users. No other studies have examined sensation-seeking and awareness of AmEDs; however, there have being studies examining sensation-seeking and other AmED related outcomes. The current study did not result in the same findings of other studies examining AmED consumption and sensation-seeking, which suggested that sensation-seeking is associated with greater AmED consumption.(13,53) Another study, one among students in grades seven to twelve in Atlantic Canada, reported an association between sensation-seeking and increased CED use.(71) CEDs are highly marketed in association with

extreme sports and high adrenaline activities, potentially exposing sensation-seeking personalities to CEDs and AmEDs more than others. Personalities attracted to the activities where CEDs and AmEDs are most heavily marketed would theoretically be more aware of AmEDs and AmED related outcomes. The current findings suggest sensation-seeking may not play as important a role in AmED consumption as others have suggested, but does have some impact on awareness. Given previous research showing an association between CEDs and sensation-seeking, the relationship may also exist in the current sample, though undetected as a result of small sub-sample size among AmED users, or of low-sensitivity of the sensation-seeking index.

6.7.7 Binge Drinking

Binge drinking was significantly associated with almost all outcomes of AmED examined in the current study. Binge drinking was significantly associated with seven different outcomes, five of which were among AmED ever users, one among AmED never users and one among the total sample. Being aware of AmEDs, ever having AmED, current use of AmED, having a pre-mixed AmED, AmED served by a bartender, for intoxication or for energy were associated with greater binge drinking. The types of AmEDs, reasons for use and location of use that were significant are indicative of consuming the beverage outside of the home in potentially social atmospheres.

Respondents who reported more frequent binge drinking were also more likely to be aware of AmEDs. This may be because respondents who binge drink, unless drinking alone, are most likely in environments where others are drinking a number of beverages that may include alcohol

and CEDs. No other studies to our knowledge have examined the association between binge drinking and AmED awareness.

In the current study, binge drinking over once a week was associated with substantially greater consumption of AmED compared to those who did not binge drink in the last twelve months. Binge drinking over once a week was associated with greater likelihood of consuming AmED when compared to binge drinking once a month or less. Findings appear to indicate that *any* binge drinking is not only significant, but increased frequency of binge drinking increase the likelihood of consuming AmED. Binge drinking or heavy drinking, has also been reported in previous studies as having a strong association with ever using AmED.(78,118) Pre-conceived benefits of consuming CEDs with alcohol include sustained vigilance, added energy and its ability to mask the taste of alcohol, preconceptions which may help explain the relationship between binge drinking and AmED use.(104,105)

Binge drinking was associated with greater frequency of AmED consumption, and increases in reported binge drinking related to increased likelihood of AmED consumption. Findings from the current study are similar to those reported in other studies. In a study among university students, past-month AmED users were significantly more likely to be heavy drinkers compared to non-AmED users.(22) AmED users compared to alcohol only users have also been reported as more likely to drink more and engage in risky drinking behaviour such as greater binge drinking occasions, consumption of a greater number of drinks in a single episode and greater number of days intoxicated in a typical week.(22) The relationship between binge drinking and AmED use likely exists for the same reasons mentioned previously for ever use of AmED: pre-conceived

benefits of consuming CEDs with alcohol. In addition, given the effects of excess alcohol consumption, it may be that the purported effects of CEDs are even more sought after when consuming large volumes of alcohol.

Respondents who reported binge drinking were more likely to consume pre-mixed AmED, those served by a bartender, in a drinking establishment, use for energy and to get drunk to be able to drink more. Few studies have examined these specific AmED outcomes and their relationship to binge drinking. When examining more closely the relationship between binge drinking and AmED use for energy, any binge drinking was significantly associated with AmED use for energy, compared to those who binge drink less than once a month. Using an AmED use for energy was much greater among those who reported binge drinking once a week compared to those who reported binge drinking more than once a week. This last finding suggests that those who reported binge drink more than once a week were using AmEDs for purposes other than for added energy, and that 'once a week binge drinking' may be a threshold for consuming AmEDs for added energy. What the current finding suggests overall is that a number of users perceive that AmED consumption as a beverage that can provide added energy. As previously described, CEDs can provided added energy through the primary effects of caffeine, but as a result may also mask the effects of alcohol, leading to greater intoxication, though findings remains mixed.(19,121,122,159)

AmED use has been associated with an increased motivation to drink and a decreased perception of intoxication, which may lead to greater alcohol consumption.(8,98) As described in a study among university students in Eastern Canada, respondents consumed significantly more alcohol

when also consuming CEDs, compared to without CEDs.(74) Mixing CEDs and alcohol may compromise one's ability to judge intoxication, judge risk, impair decision-making and lead to a number of adverse physical and psychological effects. Binge drinking is prevalent among youth and young adults, and regular binge drinking may be a risk factor for AmED consumption, or AmEDs may encourage binge drinking.(79) It is not possible to determine the direction of the relationship between binge drinking and AmED consumption from the current study, but in either event, the association is one that is cause for concern.

6.7 Limitations and Strengths

Limitations

The current study was based on findings collected using an online survey. Half of the sample was selected from a probability based method, and the other half was self-enrolled to the commercial panel. Self-selection bias may be a limitation of this study, as some individuals by nature will be more likely to participate in an online survey, while some will not, resulting in a systematic bias; though it has also been reported that internet surveys are not affected by uninterested or recurrent respondents.(160,161) Other research however has shown that no subgroups of individuals were particularly deterred from participating in an online survey and that findings from online surveys are consistent with those of other methods, including telephone and in person.(161,162) As with other online surveys, some high-risk groups could not be reached by this methodology, including individuals who are homeless, who cannot access a computer, who have limited literacy skills or who have limited understanding of English or French knowledge, and as such they may be underrepresented in the sample. AmED use may be underreported as a result of the nature of an online survey, as high risk groups excluded may be

more likely to consume AmED. However, more than 90% of the age group examined should have had some access to a computer with internet, so the potential exclusion from this barrier is low.(163)

Some of the characteristics of the current sample differ from those of the Canadian population. The current sample had overrepresentation from Quebec of approximately twice its proportion in the national population.(164) There was a slightly higher proportion of women than men in the overall sample, which stemmed primarily from a higher female representation among the young adults in the sample. There was also a slightly higher proportion of females than in the Canadian population, where males and females each comprise about half the population.(164) Age distribution was not equal across age groups. About half the sample was under eighteen, and half the sample was aged eighteen and over, however the age group of 18-20 years was about half that of 21-24 year olds. Compared to the Canadian population, we see a relatively even distribution across age groups, with variations of only a few percent between years.(164) Lower rates for AmED use reported in this study may be explained by the higher female representation and lower representation of 18-20 year olds in the sample. Females typically tend to consume less AmEDs than do males, and they were overrepresented among young adults specifically, which would have decreased AmED outcomes reported. Moreover, among young adults, 18-20 year olds are the biggest consumers of AmEDs and underrepresented in the sample, which would further reduce AmED outcomes reported in this study.(164) Some discrepancies between the demographic characteristics of the current sample compared to that of the Canadian population might have affected the prevalence estimates for alcohol and AmED reported. Province, gender and age were controlled for in all models, though the current study is not generalizable to the

general population. Responses were not weighted to avoid giving the impression of the current study being representative and because the American Association for Public Opinion Research does not make any recommendations on doing so for samples using logistic regressions.(165) However, the current findings do provide valuable information on AmEDs and is among the first community-based samples on the topic. The population captured in our online survey is relatively similar to those of other Canadian surveys; however, respondents were not selected with the same specificity as in other nationally representative samples.(114)

Responses of the current study were self-reported, which may have resulted in underreporting of certain characteristics (e.g. BMI) and of outcomes examined (alcohol use, AmED use, risk behaviour). There is some evidence that when self-reporting behaviours, particularly those of a more sensitive nature such as substance use, social-desirability bias can lead to underestimation.(166) However, other research has found that adolescents self-reports around sensitive behaviours, including alcohol consumption specifically, were both valid and reliable.(167) Alcohol use is often underreported, and by association AmED use may also be underreported in the current survey.(168) Many of the questions were asked about use and behaviours over the past twelve months, which may have led to recall bias.

Parental consent was required for minors to complete the survey, however, it remains unknown if respondents were able to complete the survey in full privacy and honesty since we do not know if the parent remained in the room or not while the respondent completed the survey. Though the survey responses are anonymous, having a parent in the room may have deterred respondents from answering honestly to some questions for fear of "getting in trouble" with their parent or

guardian, another potential contributor to underreporting of alcohol and AmED outcomes, especially binge drinking, current use of AmED and risk behaviour.

The current study involves cross-sectional data, which limits the ability to assess causal relationships. The findings from this study can only claim associations. There were a large number of multiple comparisons in the analysis as a result of including a number of covariates of interest. As a result of these multiple comparisons, some fraction of the significant associations may be false positives. Because of the large number of multiple comparisons and the exploratory nature of the current study, adjustments were not included for p-values of multiple comparisons. Lastly, not all relationships of AmED and all key social determinants could be examined, including a measure of socioeconomic status like family income, family structure, other substances or mental health outcomes, such as depression and suicidal thoughts.

Strengths

The current survey was developed from a number of national and provincial Canadian questionnaires, and pilot tested. The questionnaire provides a great level of detail on AmED consumption and patterns of use beyond that of other Canadian and international studies. The online format of this survey allowed respondents to provide anonymous responses, in addition to being the best and most efficient way to reach the targeted population, youth and young adults. To our knowledge this is the first study to examine such a large number of AmED specific patterns of use with the degree of detail achieved in the current study, and in combination with a number of key socio-demographic and behavioural outcomes. Moreover, the current study is

community-based, whereas other Canadian studies among this population are school based. This appears to be the largest AmED and CED-specific study in Canada to date.

6.8 Future Research

We are currently in a critical time period where Health Canada is monitoring CEDs, and thus future research is time sensitive. The current market is changing rapidly, and it is critical that we monitor and evaluate the changes taking places, as well as the effect of any changes in regulation, especially around access to minor. As the current study is a part of a larger CIHR-funded study on caffeinated energy drinks, there will be a second Canada-wide survey conducted in the fall of 2015 to provide some longitudinal data and to examine consistency of the current findings across the overall sample and sub-samples. Additionally, focus groups were conducted in the fall of 2014 with youth and young adults in French and in English to gather additional information around the consumption patterns of CEDs, including AmEDs. Current findings should be replicated in the 2015 survey as well as in other population-based AmED studies to evaluate their consistency across samples and at different time points.

Future research should examine the relationship between CEDs and increased alcohol consumption to better understand pattern of use around AmED consumption as well as physiological effects of co-ingestion of CEDs and alcohol. Currently, it remains unclear what the physiological effects are of AmED consumption, and more evidence is needed to understand how these beverages affect youth in particular.

Mental health variables were not included in the current study, but are important to include in future research given the increased rates of mental health problems among Canadian youth. Substance abuse was also omitted from the current study, but is becoming problematic among Canadians and should be examined more closely in relation to AmEDs. Most importantly longitudinal research is needed to examine temporal order and causality with respect to AmED outcomes, especially between binge drinking and AmED use. Lastly, more attention should be given to evaluating and accessing the effects of policy and regulatory changes affecting both CEDs and AmEDs.

7.0 CONCLUSIONS

The prevalence and awareness of alcohol and caffeinated energy drink use among Canadian youth and young adults are high. AmEDs are commonly consumed in a number of formats, both in private residence and in food and drink establishments, and commonly used for intoxication and added energy. AmED use is more likely among older youth and young adults and increases with age. However, youth fifteen to seventeen were more likely to use self-mixed AmEDs than young adults - underage respondents who should not be able to access alcohol. Additional measures are needed to restrict the sale of CEDs to minors, as other countries have already done, in order to help restrict access of AmEDs to youth. The current findings should be replicated in the next survey round in the fall of 2015 in order to examine consistency over time.

The primary reason for using AmED among youth and young adults is for intoxication and AmED consumption is strongly associated with binge drinking; these findings highlight the

association of AmEDs with excessive alcohol consumption. The combined use of CEDs and alcohol may lead to a number of negative outcomes, including increased intoxication and risk behaviour. In Canada, AmED use appears to be increasing along with alcohol related accidents.(79) Risk behaviour is greater among AmED users; combined use of CEDs and alcohol may lead to a number of negative outcomes, especially being in a car with a driver who had been drinking. Drunk driving has been increasing in Canada and remains an important public health concern. The reasons for use of AmED and the alcohol drinking patterns associated with AmEDs are cause for concern and highlight the need for stronger regulations to limit the consumption of this beverage as well as education efforts to inform youth and young adults of the effects and consequences.

The current findings have several policy implications. Underage youth appear to have easy access to CEDs and AmEDs. To reduce prevalence of use among youth, marketing restrictions and a ban on the sale of CEDs to minors may be required. Young adults appear to be highly exposed to CEDs and AmEDs almost everywhere in their environment. A ban on the sale of CEDs in municipal buildings, schools, recreational complexes and sports facilities, as is implemented in regions of Quebec, could help reduce CED and AmED use.

AmEDs continue to be readily available in bars, pubs, restaurants and at public events and festivals, even though CED labelling clearly states that the product should not be mixed with alcohol. Furthermore, though the addition of alcohol to CEDs is prohibited, pre-mixed AmEDs are still available and consumed by youth and young adults. The current policies and regulations are ineffective and should be reviewed. Banning the sale of CEDs in food and beverage

establishments may be necessary to prevent the consumption of AmEDs in these venues. There is also ambiguity around the sale of pre-mixed AmEDs, better policy could have significant impacts on the current rates of consumption in Canada. Improvements to the regulatory framework around AmEDs are imperative to halt the rise in AmED use among youth and young adults, and decrease prevalence over time.

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Appendices

Appendix A. CED and AmED Online-Survey

CED Survey (main content)

Note: Extra programmer instructions are deliberately left out of the French, since the instructions/routing are the same as the English version

Parent Screening & Information		
Welcome, and thank you for your interest in our food and beverage study. Please click "Start Survey" to begin the survey.		Bienvenue et merci de votre intérêt à notre étude sur les aliments et boissons. S'il vous plaît cliquer sur "Commencer le Sondage" pour commencer le sondage.
Screen.age	**Before we begin, how old are you?** Enter age: _____ Refuse to answer **If under age 12** → "Sorry, you are not eligible to participate, but thank you for your time." [TERMINATE] **If 12-17 years** → "Please close your browser. Your parent must click the link to begin the survey before you can participate." [TERMINATE] **If 18-24 years** → [Proceed to Participant section – Autofill age and start at gender] **If over age 25** → [Proceed to Parent questions]	**Avant de commencer, quel âge avez-vous?** Indiquer l'âge : _____ Refus de répondre **If under age 12** → « Désolé, mais vous n'êtes pas éligible à participer. Merci de votre temps. » [TERMINATE] **If 12-17 years** → « S'il vous plaît fermez la fenêtre de navigation. Votre parent doit cliquer sur le lien pour commencer l'enquête avant de pouvoir participer.» [TERMINATE] **If 18-24 years** → [Proceed to Participant section – Autofill age and start at gender] **If over age 25** → [Proceed to parent questions]
Parent.kids	[*Ask if age>=25*] **Do you have any kids between the ages of 12 and 17 living in your household?** **Yes**, I have a child between the age of 12 and 17 living in my household [CONTINUE]	[*Ask if age>=25*] **Avez-vous des enfants âgés entre 12 et 17 ans vivant dans votre foyer?** **Oui**, j'ai un enfant âgé entre 12 et 17 ans vivant dans mon foyer. [CONTINUE]

	No, I do not have a child between the age of 12 and 17 living in my household → "Thank you for your time. [TERMINATE]	**Non**, je n'ai pas un enfant âgé entre 12 et 17 ans vivant dans mon foyer. → "Merci de votre temps." [TERMINATE]
Participant - Study Information		
Parent.consent	**We would like to invite your child to participate in a study that looks at the views and opinions of youth on caffeine consumption and energy drinks.** The survey is being conducted by Professor David Hammond of the University of Waterloo, Canada. • Your child will be asked questions about energy drinks, different foods with caffeine, as well a variety of beverage types, including sports drinks, coffee, and alcohol. Background questions will also be asked (e.g., gender, height, weight, ethnicity, education). • Participation is voluntary and your child may skip any question that he/she does not want to answer. Your child will not be asked for their name or any identifying information. • All of the information provided in this study will be kept strictly confidential. Study data, with no personal information, will be kept indefinitely on a secured University of Waterloo server. • Your child can stop answering the survey at any time without penalty. Any data already collected may be used in the study, unless you contact the researcher to have it deleted.	**Votre enfant est invité à participer à une étude sur les aliments et les boissons.** Le sondage est menée par le professeur David Hammond du School of Public Health and Health Systems à l'Université de Waterloo, Canada. • Votre enfant sera posé des questions sur les boissons énergisantes, différents aliments contenant de la caféine, ainsi que d'une variété de types de boissons, y compris les boissons désaltérantes, le café et l'alcool. Des questions de fond seront également invités (par exemple, le sexe, la taille, le poids, l'origine ethnique, l'éducation). • La participation est volontaire et vous pouvez sauter n'importe quelle question auquel vous ne voulez pas répondre. Vous n'aurez pas à fournir votre nom ou toute autre information qui pourrait vous identifier. • Toutes l'information fournies dans cette étude sera gardée strictement confidentielle. Les données issues de l'étude, sans aucune information personnelle, seront conservés indéfiniment sur un serveur sécurisé de l'Université de Waterloo. • Votre enfant est libre de choisir ou non de participer à cette étude, et vous pouvez vous en retirer à

	• This study has been reviewed by and received ethics clearance through a University of Waterloo Research Ethics Committee. If you have any comments or concerns resulting from your involvement in this study, please contact Dr. Maureen Nummelin, the Director, Office of Research Ethics, at 1-519-888-4567, Ext. 36005 or maureen.nummelin@uwaterloo.ca,. • If you have any questions about the study you can contact Dr. David Hammond of the University of Waterloo at 519-888-4567 ext. 36462 or dhammond@uwaterloo.ca. **Can he/she participate in the survey?** **If your child is not available at this moment, you can close the browser window. Once your child is available, you can simply re-click on the survey link to continue.** **Yes**, he/she can participate right now. → "We would like to ask that you pass the survey off to your child so that he/she can participate. Thank you for your assistance!" [**Programmer:** *Mark as "Parent Consented"*] *GO TO SURVEY* **Yes**, he/she can participate later. → "You can close the browser window. Once your child is available, you can simply re-click on the survey link to continue. Thank you for your participation." [**Programmer:** *Mark as "Parent Consented"*] *TERMINATE*	n'importe quel moment sans pénalité. Toutes les données recueillies peuvent être utilisées dans l'étude, à moins que vous contacter le chercheur afin de les faire supprimées. • Cette étude a été examinée et a reçu une attestation de conformité par un comité du Bureau de l'éthique de la recherche de l'Université de Waterloo. Si vous avez des commentaires ou des préoccupations résultant de votre implication dans cette étude, vous pouvez communiquer avec la Chef de l'éthique, Bureau de l'éthique de la recherche au 519-888-4567 poste 36005 ou maureen.nummelin@uwaterloo.ca. • Si vous avez des questions au sujet de l'étude, vous pouvez contacter le professeur David Hammond de l'Université de Waterloo au 519-888-4567 poste 36462 ou dhammond@uwaterloo.ca. **Peut-il /elle participer au sondage?** **Si votre enfant n'est pas disponible en ce moment, vous pouvez fermer la fenêtre de navigation. Lorsque votre enfant sera disponible, vous n'aurez qu'à cliquer à nouveau sur le lien au sondage continuer. ** **Oui**, il/elle peut participer maintenant. → "Nous voudrions vous demander de passer le sondage à votre enfant pour qu'il/elle puisse participer. Merci de votre collaboration!" [**Programmer:** *Mark as "Parent Consented"*] *GO TO SURVEY* **Oui**, il/elle peut participer plus tard. → "Vous pouvez

	No, he/she cannot participate in the survey. → "Thank you for your time." [*TERMINATE* – Refusal]	fermer la fenêtre de navigation. Lorsque votre enfant sera disponible, vous n'aurez qu'à cliquer à nouveau sur le lien au sondage continuer. Merci de votre participation." [**Programmer:** *Mark as "Parent Consented"*] *TERMINATE* **Non**, il/elle ne peut pas participer au sondage. → "Merci de votre temps." [*TERMINATE* – Refusal]
Participant – Screening and Information		
	Welcome, and thank you for your interest in our food and beverage study. Please click "Next" to begin the survey.	Bienvenue et merci de votre intérêt à notre étude sur les aliments et boissons. S'il vous plaît cliquer sur "Suivant" pour commencer le sondage.
age	**Before we begin, how old are you?** Enter age: _____ Refuse to answer **If 12-24 years** → [Proceed to Information] **If under age 12 or over 24** → "Unfortunately, we can only include people age 12-24 in this study. Sorry, you are not eligible to participate, but thank you for your time." [TERMINATE] →**IF REFUSE TO ANSWER:** Unfortunately, we need to know your age to determine your eligibility for the study.	**Avant de commencer, quel âge avez-vous?** Indiquer l'âge : _____ Refus de répondre **If 12-24 years** → [Proceed to Information] **If under age 12 or over 24** → « Malheureusement, seules les personnes âgées de 12 à 24 ans peuvent participer à cette étude. Désolé, mais vous n'êtes pas éligible à participer. Merci de votre temps. » [TERMINATE] →**IF REFUSE TO ANSWER:** Malheureusement, nous devons connaître votre âge afin de déterminer votre admissibilité à l'étude.
Gender	**Are you male or female?** 1 Female 2 Male 88. Refuse to answer	**De quel sexe êtes-vous?** 1 Femme 2 Homme -88 Refus de répondre

QUOTAS
500 females aged 12-17
500 males aged 12-17
500 females aged 18-24
500 males aged 18-24

Participant - Study Information	
Please read the following information carefully, and once you have read the study details and agree to them, you can begin the survey. - You are being asked to participate in a research study about food and beverages. The survey is being conducted by Professor David Hammond of the School of Public Health and Health Systems at the University of Waterloo, Canada. - You will be asked questions about energy drinks, different foods with caffeine, as well as a variety of beverage types, including sports drinks, coffee, and alcohol. - The survey takes approximately 20 minutes to complete. - Participation is voluntary and you may skip any question that you do not want to answer. You will not be asked to provide your name or any identifying information. - To thank you for your time, you or your parent/guardian will receive the usual level of payment from the survey company. - All of the information you provide in this study will be kept strictly	S'il vous plaît lire attentivement les informations suivantes, et une fois que vous avez lu et accepté les détails de l'étude, vous pouvez commencer le questionnaire de sondage. - Vous êtes invité à participer à une étude sur les aliments et les boissons. Le sondage est menée par le professeur David Hammond du School of Public Health and Health Systems à l'Université de Waterloo, Canada. - Vous serez posé des questions sur les boissons énergisantes, différents aliments contenant de la caféine, ainsi que d'une variété de types de boissons, y compris les boissons désaltérantes, le café et l'alcool. - Le questionnaire de sondage prend environ 20 minutes à compléter. - La participation est volontaire et vous pouvez sauter n'importe quelle question auquel vous ne voulez pas répondre. Vous n'aurez pas à fournir votre nom ou toute autre information qui pourrait vous identifier. - En guise de remerciement de votre temps, vous ou votre parent ou tuteur recevra la rémunération habituellement offerte par la société menant l'enquête.

confidential - only the investigators directly associated with the study will have access to this information. Study data, with no personal information, will be kept indefinitely on a secured University of Waterloo server.	- Toutes l'information que vous fournissez dans cette étude sera gardée strictement confidentielle - seul les chercheurs directement liés à l'étude auront accès à cette information. Les données issues de l'étude, sans aucune information personnelle, seront conservés indéfiniment sur un serveur sécurisé de l'Université de Waterloo.
- You are free to choose whether or not to participate in this study, and you can choose to stop being a part of it at any time without penalty. If you choose to discontinue the survey, you may receive remuneration by declining all further questions until the end of the survey. Any data already collected may be used in the study, unless you contact the researcher to have it deleted.	- Vous êtes libre de choisir ou non de participer à cette étude, et vous pouvez vous en retirer à n'importe quel moment sans pénalité. Si vous choisissez d'abandonner au cours de l'enquête, vous pouvez tout de même recevoir la rémunération en refusant de fournir une réponse à toutes les autres questions jusqu'à la fin de l'enquête. Toutes les données recueillies peuvent être utilisées dans l'étude, à moins que vous contacter le chercheur afin de les faire supprimées.
- This project has been reviewed and received ethics clearance through a University of Waterloo Research Ethics Committee. However, the final decision about participation is yours. Participants who have concerns or questions about their involvement in the project may contact the Chief Ethics Officer, Office of Research Ethics at 519-888-4567, ext. 36005 or maureen.nummelin@uwaterloo.ca.	- Cette étude a été examinée et a reçu une attestation de conformité par un comité du Bureau de l'éthique de la recherche de l'Université de Waterloo. Toutefois, la décision finale sur la participation est la vôtre. Les participants qui ont des préoccupations ou des questions au sujet de leur participation à ce projet peuvent communiquer avec la Chef de l'éthique, Bureau de l'éthique de la recherche au 519-888-4567 poste 36005 ou maureen.nummelin@uwaterloo.ca.
- If you have any questions about the study you can contact Professor David Hammond of the University of Waterloo at 519-888-4567 ext. 36462 or dhammond@uwaterloo.ca.	- Si vous avez des questions au sujet de l'étude, vous pouvez contacter le professeur David Hammond de l'Université de Waterloo au 519-888-4567 poste

		36462 ou dhammond@uwaterloo.ca.
Consent		
consent	Based on the information you received, do you agree to take part in this research study being conducted by Professor David Hammond of the University of Waterloo? Yes → [*continue to survey*] No → Thank you for your time. [*TERMINATE]*	Selon les renseignements que vous avez reçu, acceptez-vous de participer à cette étude de recherche menée par le professeur David Hammond de l'Université de Waterloo? Oui → [*continue to survey*] Non → Nous vous remercions du temps que vous nous avez consacré. [*TERMINATE]*

Caffeine intake: 24-hour recall	

Patterns of CED consumption		
Awareness CED.aware	**We would like to ask you some more questions about energy drinks. Popular brands include *Red Bull, Monster, Rockstar, NOS, Amp*, and *Full Throttle*, but there are others. DO NOT include sports drinks, such as *Gatorade* or *Powerade*.**	**Nous aimerions vous poser d'autres questions sur les boissons énergisantes. Les marques populaires comprennent *Red Bull*, *Monster*, *Rockstar*, *NOS*, *Amp* et *Full Throttle*, mais il en existe d'autres. NE PAS inclure les boissons désaltérantes, telles que *Gatorade* ou *Powerade.***
Ever use CED.ever.use	*Programmer note: Code as 1 and skip to CED.age.initiate if selected "Energy drink" or "Energy shot" in screener (CI.A.list=5)* **Have you <u>ever</u> tried an energy drink, even a few sips?** Include energy drinks mixed with other drinks. 1 Yes 2 No -77 Don't know -88 Refuse to answer	**Avez-vous déjà essayé une boisson énergisante, ne serait-ce que quelques gorgées?** Inclure les boissons énergisantes mélangées à d'autres boissons. 1 Oui 2 Non -77 Je ne sais pas -88 Refus de répondre
Consumption-Age of initiation	*Programmer note: only ask if CED.ever.use = 1 (Ever users)* **How old were you when you first tried an energy drink,**	**Quel âge aviez-vous lorsque vous avez essayé une**

CED.age.initiate	**even just a few sips?** Enter age: _____[*numeric field, limit of 1 to current age*] -77 Don't know -88 Refuse to answer	**boisson énergisante pour la première fois, ne serait-ce que quelques gorgées?** Indiquer l'âge : _____[*numeric field, limit of 1 to current age*] -77 Je ne sais pas -88 Refus de répondre
Consumption-Frequency of use CED.last.use	*Programmer note: only ask if CED.ever.use = 1 (Ever users)* **When was the <u>LAST TIME</u> you had an energy drink?** Include any energy drinks mixed with alcohol. In the last 24 hours In the last 7 days In the last 30 days In the last 6 months In the last 12 months More than 12 months ago -77 Don't know -88 Refuse to answer	**Quand était la <u>DERNIÈRE FOIS</u> que vous avez bu une boisson énergisante?** Inclure les boissons énergisantes mélangées avec de l'alcool. Au cours des 24 dernières heures Au cours des 7 derniers jours Au cours des 30 derniers jours Au cours des 6 derniers mois Au cours des 12 derniers mois Il y a plus de 12 mois -77 Je ne sais pas -88 Refus de répondre
Consumption-Amount consumption.amount	*Programmer note: only ask if CED.ever.use = 1 (Ever users)* **How many energy drinks have you consumed in your life?** 1 drink = 1 can, container or glass, including energy drinks mixed with alcohol. If you are not sure, please provide your best guess. None 1 drink or less 2-5 drinks 6-10 drinks 11-20 drinks	**Combien de boissons énergisantes avez-vous consommées au cours de votre vie?** Une boisson = une cannette, un contenant ou un verre, y compris les boissons énergisantes mélangées avec de l'alcool. Si vous n'êtes pas sûr, s'il vous plaît indiquer votre meilleure estimation. Aucune 1 boisson ou moins 2 à 5 boissons 6 à 10 boissons 11 à 20 boissons

	21-50 drinks 51-100 drinks More than 100 drinks -77 Don't know -88 Refuse to answer	21 à 50 boissons 51 à 100 boissons Plus de 100 boissons -77 Je ne sais pas -88 Refuse de répondre
Consumption-Patterns Day2.conDay3.con Day4.con Day5.con Day6.con Day7.con Day2.n Day3.n Day4.n Day5.n Day6.n Day7.n	*Programmer note: only ask if* CED.last.use *= 1 or 2* **Now, please think about the energy drinks you've had in the past week. You already told us about yesterday. This question asks about the other days in the past week.** **Did you have any energy drinks on …** **[date for 2 days prior – i.e., Wednesday April 23]** **[date for 3 days prior – i.e., Tuesday April 22]** **[date for 4 days prior – i.e., Monday April 21]** **[date for 5 days prior – i.e., Sunday April 20]** **[date for 6 days prior – i.e., Saturday April 19]** **[date for 7 days prior – i.e., Friday April 18]** 1 Yes 2 No -77 Don't know -88 Refuse to answer [***Programmer****: For any days that they selected "Yes" for in Day2.con . . . Day7.con, ask the following, inserting the date*] **How many energy drinks did you have on [*insert day*]?** Please enter the number of each type/size that you had in the boxes below. [*Show 3 images (*energyshot_60.jpg, energycan_250.jpg, energycan_473.jpg*) and have number entry boxes below or beside each one*] _____ [*numeric fields, limit 1 to 20*] -77 Don't know	**Maintenant, s'il vous plaît penser aux boissons énergisantes que vous avez consommées au cours de la dernière semaine. Vous nous avez déjà indiqué pour ce qui est d'hier. Cette question porte sur les autres jours de la dernière semaine.** **Avez-vous consommé des boissons énergisantes sur … [lundi, mardi, mercredi, jeudi, vendredi, samedi, dimanche]** 1 Oui 2 Non -77 Je ne sais pas -88 Refus de répondre **Combien de boissons énergisantes avez-vous consommées le [insert day]?** S'il vous plaît indiquer le nombre de chaque type / taille que vous aviez dans les cases ci-dessous. Indiquer le nombre : _____ [*numeric field, limit 1 to 20*] -77 Je ne sais pas -88 Refus de répondre

	-88 Refuse to answer	
Consumption – amount CED.max#	*Programmer note: only ask if CED.ever.use = 1 (Ever users)* **What is the largest number of energy drinks you have ever had <u>IN ONE DAY?</u>** Include any energy drinks mixed with alcohol. Enter number: _____ [*numeric*] -77 Don't know -88 Refuse to answer	**Quelle est le plus grand nombre de boissons énergisantes que vous avez consommé <u>EN UNE JOURNÉE?</u>** Inclure les boissons énergisantes mélangées avec de l'alcool. Indiquer le nombre : _____ [*numeric*] -77 Je ne sais pas -88 Refus de répondre
Consumption – Situation (CED.where) CED.where1 CED.where2 CED.where3 CED.where4 CED.where5 CED.where6 CED.where7 CED.where8 CED.where9	**Have you EVER had an energy drink in the following places?** Select all that apply. 1 At work 2 At school 3 While driving 4 At home 5 At someone else's house 6 At a restaurant 7 At a bar/pub/nightclub 8 At the gym or while playing sports 9 Somewhere else → Please specify: [*open-ended*] -77 Don't know -88 Refuse to answer	**Avez-vous déjà consommé une boisson énergisante dans les endroits suivants?** Choisissez toutes les réponses qui s'appliquent. 1 Au travail 2 À l'école 3 En conduisant 4 À la maison 5 À la maison de quelqu'un d'autre 6 Dans un restaurant 7 Dans un bar/pub/boîte de nuit 8 Dans un centre sportif ou en faisant du sport 9 Ailleurs → Veuillez préciser : _____ -77 Je ne sais pas -88 Refus de répondre
Offered CED.offer	*Programmer note: only ask if CED.ever.use = 0 or -77(Never users)* **Have you ever been offered an energy drink to try?** 1 Yes 2 No -77 Don't know -88 Refuse to answer	**Vous a-t-on déjà offert une boisson énergisante pour en faire l'essai?** 1 Oui 2 Non -77 Je ne sais pas -88 Refus de répondre
Friend Use CED.friend#	**Of your five closest friends, how many have tried energy drinks?**	**De vos cinq meilleurs amis, combien ont déjà essayé des boissons énergisantes?**

	None 1 friend 2 friends 3 friends 4 friends 5 friends -77 Don't know -88 Refuse to answer	Aucun 1 ami 2 amis 3 amis 4 amis 5 amis -77 Je ne sais pas -88 Refus de répondre
Interest in trying CED.useagain	*Programmer note: only ask if CED.ever.use = 1 (Ever users)* **Do you think you might have an energy drink in the future?** Definitely yes Probably yes Not sure Probably not Definitely not -77 Don't know -88 Refuse to answer	**Pensez-vous que vous consommeriez une boisson énergisante dans le futur?** Certainement, oui Probablement, oui Pas sûr Probablement pas Certainement pas -77 Je ne sais pas -88 Refus de répondre
Interest in trying CED.try.interest	*Programmer note: only ask if CED.ever.use = 0 or -77 (Never users)* **Are you interested in trying an energy drink in the future?** Definitely yes Probably yes Not sure Probably not Definitely not -77 Don't know -88 Refuse to answer	**Êtes-vous intéressé à essayer une boisson énergisante dans le futur?** Certainement, oui Probablement, oui Pas sûr Probablement pas Certainement pas -77 Je ne sais pas -88 Refus de répondre
Susceptibility 2 CED.try.bestfriend	*Programmer note: only ask if CED.ever.use = 0 or -77 (Never users)* **If one of your best friends were to offer you an energy drink, would you drink it?** Definitely yes Probably yes Not sure	**Si un de vos meilleur(e)s ami(e)s vous offrait une boisson énergisante, la boiriez-vous?** Certainement, oui Probablement, oui Pas sûr Probablement pas

	Probably not Definitely not -77 Don't know -88 Refuse to answer	Certainement pas -77 Je ne sais pas -88 Refus de répondre
susceptibility	[*Programmer: Create susceptibility variable - "Not Susceptible" if CED.try.interest and CED.try.bestfriend are BOTH "definitely not", "Susceptible" if any other answer to these.]*	
Brand awareness Brand.aware	**Before starting the survey, had you heard of any of the following brands of energy drinks?** Select all that apply. Red Bull Monster Rockstar 5-Hour Energy NOS Amp Full Throttle Red Rain Xenergy (Xyience) Shred Rage Guru Hype Other brand → Please specify: [*open-ended*] I have not heard of any of these brands -77 Don't know -88 Refuse to answer	**Avant de commencer le sondage, aviez-vous entendu parler de l'une des marques de boissons énergisantes suivantes ?** Choisissez toutes les réponses qui s'appliquent. Red Bull Monster Rockstar 5-Hour Energy NOS Amp Full Throttle Red Rain Xenergy (Xyience) Shred Rage Guru Hype Autre marque → Veuillez préciser : _____ Je n'ai jamais entendu parler d'aucune de ces marques -77 Je ne sais pas -88 Refus de répondre
Consumption – Brands tried Brand.tried	*Programmer note: only ask if CED.ever.use = 1 (Ever users)* *….and only show options selected in Brand.aware* **Which, if any, of these brands have you EVER tried?** Select all that apply.	**Parmi ces marques, quelles, s'il y en a, avez-vous DÉJÀ essayées?** Choisissez toutes les réponses qui s'appliquent.

	[***Programmer:*** *Insert list of brands selected in brand.aware, including anything typed under "Other*] Other brand → Please specify: [*open-ended*] I have not tried any of these brands -77 Don't know -88 Refuse to answer	[***Programmer:*** *Insert list of brands selected in brand.aware, including anything typed under "Other*] Autre marque → Veuillez préciser : _____ Je n'ai pas essayé aucune de ces marques. - 77 Je ne sais pas -88 Refus de répondre
Brand preference Usual.brand	*Programmer note: only ask if CED.ever.use = 1 (Ever users)* *….and only show options selected in Brand.tried* **What brand(s) do you usually drink?** Select all that apply. [***Programmer:*** *only insert brand family list selected in brand.tried, including anything typed under "Other]* Other brand → Please specify: [*open-ended*] I don't have a usual brand -77 Don't know -88 Refuse to answer	**Quelles marques buvez-vous habituellement?** Choisissez toutes les réponses qui s'appliquent. [***Programmer:*** *only insert brand family list selected in brand.tried, including anything typed under "Other]* Autre marque → Veuillez préciser : _____ Je n'ai pas de marque habituelle -77 Je ne sais pas -88 Refus de répondre
Purchase - Ever Purchase.ever	*Programmer note: only ask if CED.ever.use = 1 (Ever users)* **Have you ever bought an energy drink for yourself in a store?** 1 Yes 2 No -77 Don't know -88 Refuse to answer	**Avez-vous déjà acheté une boisson énergisante, pour vous-même, dans un magasin?** 1 Oui 2 Non -77 Je ne sais pas -88 Refus de répondre
Purchase - Locations Purchase.place	*Programmer note: only ask if* Purchase.ever *= 1 (Ever users & purchaser)* **Where have you purchased energy drinks?** Select all that apply. [*Pre-coded checklist or yes/no for each option*] 1 Convenience store/corner store/gas station 2. Grocery store/supermarket 3. Liquor store 4. From a friend/relative 5. Vending machine	**Où avez-vous acheté des boissons énergisantes?** Choisissez toutes les réponses qui s'appliquent. [*Pre-coded checklist or yes/no for each option*] 1. Un dépanneur/un magasin du coin/une station-service 2. Une épicerie/un supermarché 3. Un magasin de vins et spiritueux 4. D'un(e) ami(e)/d'un membre de ma famille 5. Dans une machine distributrice 6. Autre → Veuillez préciser : _____

	6. Other → Please specify: [*open-ended*] -77 Don't know -88 Refuse to answer	-77 Je ne sais pas -88 Refus de répondre
Brand choice – factors (Choice.factors) Choice.energy Choice.sugar Choice.crash Choice.ingredients Choice.price Choice.brand Choice.convenience Choice.flavour Choice.caffeine	*Programmer note: only ask if CED.ever.use = 1 (Ever users). Rrandomize order of response options* **Rate the importance of each of the following factors when choosing an energy drink.** **1 Not at all important 2 3 4 5 Very important Don't know Refuse to answer** **Energy boost** **Sugar level** **Crash effect** **Ingredients like vitamins and herbal ingredients** **Price** **Brand** **Convenience** **Taste / flavours** **Caffeine level**	**Attribuez une cote à l'importance que vous accordez à chacun des facteurs suivants lorsque vous choisissez une boisson énergisante.** **1 Pas du tout important 2 3 4 5 Très important Je ne sais pas Refus de répondre** **Poussée "boost" d'énergie** **Teneur en sucre** **L'effet de la chute ou le "crash"** **Ingrédients tels que les vitamines et composantes à base de plantes** **Prix** **La marque** **Le côté pratique** **Goût/saveurs** **Teneur en caféine**

Warning.statement1	**As far you know, are there any warning statements on cans or bottles of energy drinks?** 1 Yes 2 No -77 Don't know -88 Refuse to answer	**D'après ce que vous savez, y a-t-il des mises en garde sur les cannettes ou les bouteilles de boissons énergisantes?** 1 Oui 2 Non -77 Je ne sais pas -88 Refus de répondre
Warning.statement2	**Please describe the warning messages or statements. If you have seen more than one warning, please describe as many as possible.** [*Open ended*] -77 Don't know -88 Refuse to answer	**S'il vous plaît décrire ces avertissements ou mises en garde. Si vous avez vu plus d'un avertissement, s'il vous plaît en décrire autant que possible.** [*Open ended*] -77 Je ne sais pas -88 Refus de répondre

Side effects		
Side-effects – Ever (side.ever) Side.CED.jolt Side.CED.headache Side.CED.jitter Side.CED.sleep Side.CED.heart Side.CED.chest Side.CED.nausea Side.CED.seizure Side.CED.headache Side.CED.sex SideCED.other Side.CED.none	*Programmer note: only ask if CED.ever.use = 1 (Ever users)* **Have you ever experienced any of the following after drinking an energy drink:** Select all that apply. [*Pre-coded checklist or yes/no for each option*] • "Jolt and crash" episodes (increased alertness and energy followed by a sudden drop in energy) • Headache • Jittery/shaking • Difficulty sleeping • Fast heart beat • Chest pain • Nausea/vomiting/diarrhea • Seizures • Decreased sexual performance • Other → Please specify: [*open-ended*] • None of the above [*Programmer: allow to select*	**Avez-vous déjà ressenti quelconques des effets suivants après avoir bu une boisson énergisante :** Choisissez toutes les réponses qui s'appliquent. [*Pre-coded checklist or yes/no for each option*] • Épisodes de "boost et crash" (vigilance et énergie accrue, suivie par une chute soudaine d'énergie) • Maux de tête • Agitation/tremblements • Difficulté à dormir • Accélération du rythme cardiaque • Douleur à la poitrine • Nausées/vomissements/diarrhée • Convulsions/crises épileptiques • Déclin de performance sexuelle • Autre → Veuillez préciser : [*open-ended*] • Aucune des réponses ci-dessus

	only if no options chosen above] -77 Don't know -88 Refuse to answer	-77 Je ne sais pas -88 Refus de répondre
Side-effects Side.med.help	*Programmer note: ask if selected "yes" to any sideeffects.ever* **Did you seek medical help or talk to a health professional about any of these side effects?** 1 Yes 2 No -77 Don't know -88 Refuse to answer	**Avez-vous demandé de l'aide médicale ou parlé à un professionnel de la santé au sujet de quelconques de ces effets secondaires?** 1 Oui 2 Non -77 Je ne sais pas -88 Refus de répondre
Coffee.intro	**The next few questions ask about your use of COFFEE.**	**Les quelques questions suivantes portent sur votre consommation de CAFÉ.**
Coffee Ever use Coffee.ever.use	*Programmer note: Skip and set to 1 if selected "Coffee" in screener (CI.A.list=1)* **Have you <u>ever</u> tried a coffee, even a few sips?** 1 Yes 2 No -77 Don't know -88 Refuse to answer	**Avez-vous déjà essayé du café, ne serait-ce que quelques gorgées?** 1 Oui 2 Non -77 Je ne sais pas -88 Refus de répondre
Coffee Consumption-Frequency of use Coffee.last.use	*Programmer note: only ask if Coffee.ever.use = 1* **When was the <u>LAST TIME</u> you had a coffee?** In the last 24 hours In the last 7 days In the last 30 days In the last 6 months In the last 12 months More than 12 months ago -77 Don't know -88 Refuse to answer	**Quand était la <u>DERNIÈRE FOIS</u> que vous avez bu un café?** Au cours des 24 dernières heures Au cours des 7 derniers jours Au cours des 30 derniers jours Au cours des 6 derniers mois Au cours des 12 derniers mois Il y a plus de 12 mois -77 Je ne sais pas -88 Refus de répondre
Side-effects – coffee (side.coffee.ever)	*Programmer note: only ask if Coffee.ever.use = 1* **Have you ever experienced any of the following after**	**Avez-vous déjà ressenti quelconques des effets suivants après avoir bu un café:**

Side.coffee.jolt Side.coffee.jitter Side.coffee.sleep Side.coffee.heart Side.coffee.chest Side.coffee.nausea Side.coffee.seizure Side.coffee.headache Side.coffee.sex Side.coffee.other Side.coffee.none	**drinking coffee:** Select all that apply. [*Pre-coded checklist or yes/no for each option*] • "Jolt and crash" episodes (feeling of increased alertness and energy followed by a sudden drop in energy) • Headaches • Jittery/shaking • Difficulty sleeping • Fast heart beat • Chest pain • Nausea/vomiting/diarrhea • Seizures • Decreased sexual performance • Other → Please specify: [*open-ended*] • None of the above [*Programmer: allow to select only if no options chosen above*] -77 Don't know -88 Refuse to answer	Choisissez toutes les réponses qui s'appliquent. [*Pre-coded checklist or yes/no for each option*] • Épisodes de "boost et crash" (vigilance et énergie accrue, suivie par une chute soudaine d'énergie) • Maux de tête • Agitation/tremblements • Difficulté à dormir • Accélération du rythme cardiaque • Douleur à la poitrine • Nausées/vomissements/diarrhée • Convulsions/ crises épileptiques • Déclin de performance sexuelle • Autre → Veuillez préciser : [*open-ended*] • Aucune des réponses ci-dessus -77 Je ne sais pas -88 Refus de répondre
	Now, back to ENERGY DRINKS.	**Maintenant, de retour aux BOISSONS ÉNERGISANTES.**

Reasons		
General reasons general.reason1 general.reason2	*Programmer note: randomize list order Pre-coded checklist or yes/no for each option* *Programmer note: only ask if CED.ever.use = 1 (Ever users)* **Have you used energy drinks for any of the following reasons?** Select all that apply. *Programmer note: only ask if CED.ever.use = 0 or -77 (Never users) AND Susceptibility=1*	*Programmer note: only ask if CED.ever.use = 1 (Ever users)* **Avez-vous déjà utilisé des boissons énergisantes pour quelconques des raisons suivantes?** Choisissez toutes les réponses qui s'appliquent. *Programmer note: only ask if CED.ever.use = 0 or -77 (Never users) AND Susceptibility=1* **Utiliseriez-vous des boissons énergisantes dans le futur pour quelconques des raisons suivantes?**

general.reason3	**Would you use energy drinks in the future for any of the following reasons?** Select all that apply. *Programmer note: only ask if CED.ever.use = 0 or -77 (Never users) AND Susceptibility=0* **Do people your age use energy drinks for any of the following reasons?** Select all that apply. 1. To stay awake or help concentrate for studying or work 2. To stay awake or alert for driving 3. To feel awake in general (not for a specific activity) 4. For the taste 5. To improve sports performance or physical activity 6. For going out or partying 7. To mix with alcohol 8. To help lose weight or help keep weight off 9. To sober up after drinking alcohol 10. To cope with a hangover 11. Energy drinks are cool 12. My friends drink them [general.reason3: "Their friends drink them"] 13. Curious/ Try something new 14. Other → Please specify: [*open-ended*] 15. None of the above [*Programmer: allow to select only if no options chosen above*] -77 Don't know -88 Refuse to answer	Choisissez toutes les réponses qui s'appliquent. *Programmer note: only ask if CED.ever.use = 0 or -77 (Never users) AND Susceptibility=0* **Est-ce que les personnes de votre âge utilisent les boissons énergisantes pour quelconques des raisons suivantes?** Choisissez toutes les réponses qui s'appliquent. 1. Pour rester éveillé ou aider la concentration pour étudier ou travailler 2. Pour rester éveillé ou alerte pour conduire 3. Pour se sentir éveillé en général (pas pour une activité particulière) 4. Pour le goût 5. Pour améliorer la performance sportive ou l'activité physique 6. Pour sortir ou faire la fête 7. Pour mélanger avec de l'alcool 8. Pour aider à perdre du poids ou maintenir son poids 9. Pour dégriser après avoir bu de l'alcool 10. Pour atténuer les symptômes d'une gueule de bois 11. Les boissons énergisantes sont cool 12. Mes ami(e)s en boivent [general.reason3: "Leurs amis les boivent"] 13. Par curiosité/Pour essayer quelque chose de nouveau 14. Autre → Veuillez préciser : _____ 15. Aucune des réponses ci-dessus -77 Je ne sais pas -88 Refus de répondre

Perceptions / risk		
CED.maximum	*Programmer note: Display CED_max_Monster image (located in the 'CED_maximum' folder)*	**Quel est le nombre <u>maximum</u> de canettes de ce**

	What is the <u>maximum</u> number of cans of this product someone <u>your age</u> should have <u>in one day</u>? Enter number: _____ cans [*numeric, limit 0 to ?]* -77 Don't know -88 Refuse to answer	**produit que quelqu'un <u>de votre âge</u> devrait consommer en <u>une journée</u>?** Indiquer le nombre: _____ cannettes [*numeric, limit 0 to ?]*] -77 Je ne sais pas -88 Refus de répondre
Caffeine.effects	**What are the main ingredient(s) in energy drinks that give the energy boost?** Please type in the box below, or select "Don't know". _____[*open-ended*] -77 Don't know -88 Refuse to answer	**Quels sont les principaux ingrédients dans les boissons énergisantes qui donnent le *boost* ou l'augmentation d'énergie?** Indiquer dans l'encadré ci-dessous ou choisir *Je ne sais pas.* _____[*open-ended*] -77 Je ne sais pas -88 Refus de répondre
Knowledge.ingredients	**Are the main ingredients in a "sports drink" (such as *Gatorade* or *Powerade*) the same ingredients that give the energy boost in energy drinks such as *Red Bull* or *Monster*?** 1 Yes 2 No -77 Don't know -88 Refuse to answer	**Est-ce que les principaux ingrédients des boissons désaltérantes (comme *Gatorade* ou *Powerade*) sont les mêmes ingrédients qui donnent le *boost* ou l'augmentation d'énergie dans les boissons énergisantes telles que *Red Bull* ou *Monster*?** 1 Oui 2 Non - 77 Je ne sais pas -88 Refus de répondre
Perceived harm Sports.drink.harm	**Do you think SPORTS DRINKS (such as *Gatorade* and *Powerade*) are…** 1 Very good for your health 2 Good for your health 3 Neither good nor bad 4 Bad for your health	**Pensez-vous que les BOISSONS DÉSALTÉRANTES (comme *Gatorade* ou *Powerade*) sont :** 1 Très bonnes pour la santé 2 Bonnes pour la santé 3 Ni bonnes ni mauvaises pour la santé 4 Mauvaises pour la santé

	5 Very bad for your health -77 Don't know -88 Refuse to answer	5 Très mauvaises pour la santé -77 Je ne sais pas -88 Refus de répondre
Perceived harm CED.harm	**Do you think ENERGY DRINKS are . . .** 1 Very good for your health 2 Good for your health 3 Neither good nor bad 4 Bad for your health 5 Very bad for your health -77 Don't know -88 Refuse to answer	**Pensez-vous que les BOISSONS ÉNERGISANTES sont :** 1 Très bonnes pour la santé 2 Bonnes pour la santé 3 Ni bonnes ni mauvaises pour la santé 4 Mauvaises pour la santé 5 Très mauvaises pour la santé -77 Je ne sais pas -88 Refus de répondre
Sports Sports.drink.sports	**Do you think that SPORTS DRINKS, such as *Gatorade* and *Powerade*, can improve performance in sports?** 1 Yes 2 No -77 Don't know -88 Refuse to answer	**Pensez-vous que les BOISSONS DÉSALTÉRANTES, telles que *Gatorade* et *Powerade,* peuvent améliorer la performance sportive?** 1 Oui 2 Non -77 Je ne sais pas -88 Refus de répondre
Sports/activity CED.sports	**Do you think that ENERGY DRINKS, such as *Red Bull*, can improve performance in sports?** 1 Yes 2 No -77 Don't know -88 Refuse to answer	**Pensez-vous que les BOISSONS ÉNERGISANTES, telles que *Red Bull,* peuvent améliorer la performance sportive?** 1 Oui 2 Non -77 Je ne sais pas -88 Refus de répondre
Caffeine content knowledge Caffeine.knowledge	*Programmer note: Ranking task-display products on screen in random position* **Which of the following products has the MOST CAFFEINE?** Select one. [*Show CK_Coffee, CK_Coke, CK_Gatorade, CK_Monster images located within the 'Caffeine_Knowledge' folder*]	**Lequel des produits suivants a le PLUS DE CAFÉINE?** Sélectionnez une réponse. [*Show CK_Coffee, CK_Coke, CK_Gatorade, CK_ Monster images located within the 'Caffeine_Knowledge' folder*] -77 Je ne sais pas

	-77 Don't know -88 Refuse to answer	-88 Refus de répondre
Caffeine effects Effects.opinion Effects.addictive Effects.anxious Effects.feel Effects.weight Effects.study Effects.sports Effects.sleep	*Programmer note: randomize list of questions* **The next few questions ask about caffeine. There are no right or wrong answers—we are interested in your opinion.** **Please indicate whether you agree or disagree with each statement.** [*Use these response options for all*] 1 – Strongly disagree 2 – Disagree 3 – In the middle 4 – Agree 5 – Strongly agree -77 Don't know -88 Refuse to answer **Caffeine is addictive.** **Caffeine makes me feel anxious.** **I like the way caffeine makes me feel.** **Caffeine can help me lose weight or help keep weight off.** **Caffeine can help me study.** **Caffeine helps me to play sports.** **Caffeine makes it hard for me to sleep at night.**	**Les quelques questions suivantes portent sur la caféine. Il n'y a pas de bonnes ou mauvaises réponses – nous sommes intéressés par votre opinion.** **S'il vous plaît indiquer si vous êtes d'accord ou non avec chaque énoncé.** [*Use these response options for all*] 1- Pas du tout d'accord 2- Pas d'accord 3- Neutre 4- D'accord 5- Entièrement d'accord -77 Je ne sais pas -88 Refus de répondre **La caféine crée une dépendance.** **La caféine me rend anxieux.** **J'aime la façon dont la caféine me fait sentir.** **La caféine peut m'aider à perdre du poids ou maintenir mon poids.** **La caféine peut m'aider à étudier.** **La caféine m'aide à faire du sport.** **La caféine rend difficile pour moi de dormir la nuit.**
Required statements Safe.self Safe.children Safe.pregnant Safe.alcohol	*Programmer note: ask first item first always, insert 1 -5 scale* **Is it safe for you to use energy drinks?** *Programmer note: ask this list in randomized order, insert 1 -5 scale* **Is it safe for children to use energy drinks?** **Is it safe for pregnant/breastfeeding women to use energy drinks?**	**Est-il sécuritaire pour vous d'utiliser des boissons énergisantes?** **Est-il sécuritaire pour les enfants de consommer des boissons énergisantes?** **Est-il sécuritaire pour les femmes enceintes/qui**

Safe.sports Safe.study	**It is safe to mix alcohol with energy drinks?** **Is it safe to use energy drinks while working out or playing sports?** **Is it safe to use energy drinks to help you study?** [*Use these response options for all*] 1 Definitely not safe 2 Probably not safe 3 In the middle 4 Probably safe 5 Definitely safe -77 Don't know -88 Refuse to answer	**allaitent de consommer des boissons énergisantes?** **Est-il sécuritaire de mélanger l'alcool avec les boissons énergisantes?** **Est-il sécuritaire de consommer des boissons énergisantes en s'entraînant ou en faisant du sport?** **Est-il sécuritaire de consommer des boissons énergisantes pour aider à étudier?** [*Use these response options for all*] 1 Absolument pas sécuritaire 2 Probablement pas sécuritaire 3 Neutre 4 Probablement sécuritaire 5 Absolument sécuritaire -77 Je ne sais pas -88 Refus de répondre
Caffeine limit Caffeine.limit	**Health Canada recommends a maximum daily caffeine intake. As far as you know, what is the maximum daily limit for caffeine recommended by Health Canada, for someone your age?** Please type the number of milligrams (mg) below**.** If you are not sure, please make a guess. _____ mg -77 Don't know -88 Refuse to answer	**Santé Canada recommande un apport quotidien maximal en caféine. À ce que vous sachiez, quelle est la limite quotidienne maximale en caféine recommandé par Santé Canada, pour quelqu'un de votre âge?** S'il vous plaît entrez le nombre de milligrammes (mg) ci-dessous. Si vous n'êtes pas certain, s'il vous plaît tenter d'estimer. _____ mg -77 Je ne sais pas -88 Refus de répondre

Knowledge, Attitudes, beliefs		
Social norms Social.norms	*Programmer note: randomize order of questions, insert 1 -7 scale, with anchors* **On a scale from 1 to 7, where 1 is "Totally UNACCEPTABLE" and 7 is "Totally ACCEPTABLE",**	**Sur une échelle de 1 à 7, où 1 signifie «Totalement INACCEPTABLE» et 7 est "Tout à fait ACCEPTABLE",** **Vos parents trouveraient-ils acceptable que vous**

	Would your <u>parents</u> think it was acceptable for you to consume energy drinks? [*1-10 scale with anchors for "Totally Unacceptable" and "Totally Acceptable"*] -77 Don't know -88 Refuse to answer **Would your <u>friends</u> think it was acceptable for you to consume energy drinks**? [*1-10 scale with anchors for "Totally Unacceptable" and "Totally Acceptable"*] -77 Don't know -88 Refuse to answer	**consommiez des boissons énergisantes?** [*1-10 scale with anchors for "Totalement <u>IN</u>ACCEPTABLE" and "Totalement ACCEPTABLE"*] -77 Je ne sais pas -88 Refus de répondre **Vos <u>amis</u> trouveraient-ils acceptable que vous consommiez des boissons énergisantes?** [*1-10 scale with anchors for "Totalement <u>IN</u>ACCEPTABLE" and "Totalement ACCEPTABLE"*] -77 Je ne sais pas -88 Refus de répondre
Campaign.aware	**Have you seen or heard any educational messages that warn about the health risks of energy drinks**? For example, in print, at school, on TV or radio, inline, or other places. 1 Yes 2 No -77 Don't know -88 Refuse to answer	**Avez-vous vu ou entendu des messages éducatifs qui mettent en garde sur les risques pour la santé des boissons énergisantes?** Par exemple, dans la presse, à l'école, à la télévision ou à la radio, en ligne, ou à d'autres endroits. 1 Oui 2 Non -77 Je ne sais pas -88 Refus de répondre

Campaign.detail	*Programmer note: ask only if campaign.aware=1* **Where have you seen the educational messages**? Select all that apply. 1 Newspaper or magazine 2 Poster or billboard 3 At School 4 On TV 5 On the radio 6 Online / Internet 7 In a store 8 Somewhere else → Please specify: [*open-ended*] -77 Don't know -88 Refuse to answer	**Où avez-vous vu des messages éducatifs?** Choisissez toutes les réponses qui s'appliquent. 1 Journal ou revue (magazine) 2 Affiche ou panneau publicitaire 3 À l'école 4 À la télévision 5 À la radio 6 En ligne/sur l'Internet 7 Dans un magasin 8 Ailleurs → Veuillez préciser : _____ -77 Don't know -88 Refuse to answer

Marketing awareness		
Marketing.awareness	**The next questions ask about advertisements for energy drinks.** *Programmer note: randomize order for the following list of questions: ced.tv, ced.social.media, ced.print, ced.online, ced.stores, ced.promotions, ced.samples*	**Les questions suivantes portent sur les publicités pour des boissons énergisantes.**
Own.ced.product	**Do you own any clothing, posters, stickers, or other products that includes a brand of energy drink?** 1 Yes 2 No -77 Don't know -88 Refuse to answer	**Êtes-vous propriétaire de vêtements, d'affiches, d'autocollants ou d'autres produits qui figure une marque de boisson énergisante?** 1 Oui 2 Non -77 Je ne sais pas -88 Refus de répondre
CED.ads ced.tv ced.social ced.online	**Have you <u>ever</u> seen the following types of ads or marketing for energy drinks:** Select all that apply. [*Pre-coded checklist or yes/no for each option*] 1 Ads on TV	**Avez-vous <u>déjà</u> vu les types d'annonces ou de publicité suivants pour des boissons énergisantes :** Choisissez toutes les réponses qui s'appliquent. [Pre-coded checklist or yes/no for each option] 1 Publicités à la télévision

ced.print ced.stores ced.promos CED.samples	2 As part of social media sites, like Facebook or Twitter 3 Ads online / on the internet 4 Ads in magazines or newspapers 5 Posters or signs in a convenience or grocery store 6 Promotion or sponsorship, such as links with sports or extreme or adventure competitions 7 Free samples or give-aways 8. None of the above [*Programmer: allow to select only if no options chosen above*] -77 Don't know -88 Refuse to answer	2 Dans le cadre de médias sociaux comme Facebook ou Twitter 3 Publicités en ligne/sur l'Internet 4 Publicités dans les revues (magazines) ou journaux 5 Affiches ou enseignes dans un dépanneur ou une épicerie 6 Promotions ou commandites, telles que des liens avec les compétitions de sports ou de sports extrêmes ou d'aventure 7 Échantillons gratuits ou cadeaux promotionnels 8. Aucune des réponses ci-dessus -77 Je ne sais pas -88 Refus de répondre
Ced.tv.last	*Programmer note: If CED.TV=1* **When was the last time you saw an energy drink ad on TV?** In the last 24 hours In the last 7 days In the last 30 days In the last 6 months In the last 12 months More than 12 months ago -77 Don't know -88 Refuse to answer	**Quand était la dernière fois que vous avez vu une publicité pour boisson énergisante à la télévision?** Au cours des 24 dernières heures Au cours des 7 derniers jours Au cours des 30 derniers jours Au cours des 6 derniers mois Au cours des 12 derniers mois Il y a plus de 12 mois -77 Je ne sais pas -88 Refus de répondre
ced.social.last	*Programmer note: If CED.social=1* **When was the last time you saw an energy drink ad as part of a social media site, like Facebook or Twitter?** In the last 24 hours In the last 7 days In the last 30 days In the last 6 months In the last 12 months More than 12 months ago	**Quand était la dernière fois que vous avez vu une publicité pour boisson énergisante dans le cadre de sites de médias sociaux comme Facebook ou Twitter?** Au cours des 24 dernières heures Au cours des 7 derniers jours Au cours des 30 derniers jours Au cours des 6 derniers mois Au cours des 12 derniers mois

	-77 Don't know -88 Refuse to answer	Il y a plus de 12 mois -77 Je ne sais pas -88 Refus de répondre
ced.online.last	*Programmer note: If CED.online=1* **When was the last time you saw an energy drink ad online / on the internet?** In the last 24 hours In the last 7 days In the last 30 days In the last 6 months In the last 12 months More than 12 months ago -77 Don't know -88 Refuse to answer	**Quand était la dernière fois que vous avez vu une publicité pour boisson énergisante en ligne/sur l'Internet?** Au cours des 24 dernières heures Au cours des 7 derniers jours Au cours des 30 derniers jours Au cours des 6 derniers mois Au cours des 12 derniers mois Il y a plus de 12 mois -77 Je ne sais pas -88 Refus de répondre
ced.print.last	*Programmer note: If CED.print=1* **When was the last time you saw an energy drink ad in magazines or newspapers?** In the last 24 hours In the last 7 days In the last 30 days In the last 6 months In the last 12 months More than 12 months ago -77 Don't know -88 Refuse to answer	**Quand était la dernière fois que vous avez vu une publicité pour boisson énergisante dans les revues (magazines) ou les journaux?** Au cours des 24 dernières heures Au cours des 7 derniers jours Au cours des 30 derniers jours Au cours des 6 derniers mois Au cours des 12 derniers mois Il y a plus de 12 mois -77 Je ne sais pas -88 Refus de répondre
ced.stores.last	*Programmer note: If* ced.stores *=1* **When was the last time you saw a poster or sign for energy drinks in a convenience or grocery store?** In the last 24 hours In the last 7 days In the last 30 days In the last 6 months	**Quand était la dernière fois que vous avez vu une affiche ou enseigne publicitaire pour boisson énergisante dans un dépanneur ou une épicerie?** Au cours des 24 dernières heures Au cours des 7 derniers jours Au cours des 30 derniers jours Au cours des 6 derniers mois

	In the last 12 months More than 12 months ago -77 Don't know -88 Refuse to answer	Au cours des 12 derniers mois Il y a plus de 12 mois -77 Je ne sais pas -88 Refus de répondre
ced.promos.last	*Programmer note: If CED.promotions=1* **When was the last time you saw a promotion or sponsorship for energy drinks?** In the last 24 hours In the last 7 days In the last 30 days In the last 6 months In the last 12 months More than 12 months ago -77 Don't know -88 Refuse to answer	**Quand était la dernière fois que vous avez vu une promotion ou commandite pour boisson énergisante?** Au cours des 24 dernières heures Au cours des 7 derniers jours Au cours des 30 derniers jours Au cours des 6 derniers mois Au cours des 12 derniers mois Il y a plus de 12 mois -77 Je ne sais pas -88 Refus de répondre
ced.samples.last	*Programmer note: If CED.samples=1* **When was the last time you saw an energy drink company offering free samples or give-aways?** In the last 24 hours In the last 7 days In the last 30 days In the last 6 months In the last 12 months More than 12 months ago -77 Don't know -88 Refuse to answer	**Quand était la dernière fois que vous avez vu une compagnie de boissons énergisantes offrir des échantillons gratuits ou des cadeaux promotionnels?** Au cours des 24 dernières heures Au cours des 7 derniers jours Au cours des 30 derniers jours Au cours des 6 derniers mois Au cours des 12 derniers mois Il y a plus de 12 mois -77 Je ne sais pas -88 Refus de répondre
Ad.target.age	*Programmer Note: Randomly assign participants to see one of four images on the screen. Show one of: ad_gym,ad_snowboard, ad_xgames, or ad_sugar (located within the 'Ad' folder).* **What age group does this ad target?** Select all that apply. 1 People younger than me	**Quel groupe d'âge cible cette annonce?** Choisissez toutes les réponses qui s'appliquent. 1 Les personnes plus jeunes que moi 2 Les personne de mon âge 3 Les personnes plus âgées que moi

	2 People my age 3 People older than me -77 Don't know -88 Refuse to answer	-77 Je ne sais pas -88 Refus de répondre
Ad.target.sport	*Programmer Note: Please show participant the same image they were assigned to in the previous question (Ad.target.age)* **Does this ad promote using Red Bull during sports?** 1 Yes 2 No -77 Don't know -88 Refuse to answer	**Est-ce que cette annonce promeut ou encourage l'utilisation de Red Bull lors d'activités sportives?** 1 Oui 2 Non -77 Je ne sais pas -88 Refus de répondre
shot	*Programmer note: insert checklist, randomize order of response options* **Which of the following do you think <u>best</u> describes this product?** Select one. [*show EnergyShot image located within the 'Shot' folder*] [*randomize order of first 6 options*] Energy drink Supplement Vitamin drink Natural health product Soft drink Food product -77 Don't know -88 Refuse to answer	**Lequel des énoncés suivants, pensez-vous, décrit <u>le mieux</u> ce produit?** Sélectionnez une réponse. [*show EnergyShot image located within the 'Shot' folder*] [*randomize order of first 6 options*] Boisson énergisante Supplément Boisson vitaminée Produit de santé naturel Boisson gazeuse Produit alimentaire -77 Je ne sais pas -88 Refus de répondre

AmED - Patterns of Use		
Aware.patterns	**The next questions ask about drinking alcohol and energy drinks together. Alcohol includes beer, wine, coolers, and liquor such as vodka, rum, gin and whiskey.**	**Les questions suivantes portent sur la consommation d'alcool et de boissons énergisantes ensemble. L'alcool comprend la bière, le vin, les panachés (les coolers) et les spiritueux tels que la vodka, le rhum, le gin et le whisky.**

Awareness AmED Aware.AmED	*Programmer note: Ask all* **Have you ever heard of mixing alcohol with energy drinks?** 1 Yes 2 No -77 Don't know -88 Refuse to answer	**Avez-vous déjà entendu parler de mélanger de l'alcool avec des boissons énergisantes?** 1 Oui 2 Non -77 Je ne sais pas -88 Refus de répondre
Awareness Jäger Aware.Jager	*Programmer note: Ask all* **Have you ever heard of a *Jägerbomb*?** 1 Yes 2 No -77 Don't know -88 Refuse to answer	**Avez-vous déjà entendu parler d'un *Jägerbomb*?** 1 Oui 2 Non -77 Je ne sais pas -88 Refus de répondre
Awareness VdkED Aware.VdkED	*Programmer note: Ask all* **Have you ever heard of *vodka Red Bull*?** 1 Yes 2 No -77 Don't know -88 Refuse to answer	**Avez-vous déjà entendu parler d'une *vodka Red Bull*?** 1 Oui 2 Non -77 Je ne sais pas -88 Refus de répondre
Ever Use Alcohol Ever.use.alc	*Programmer note: Ask all* **Have you ever had a drink of alcohol that was more than just a sip?** 1 Yes 2 No -77 Don't know -88 Refuse to answer	**Avez-vous déjà bu de d'alcool, qui était de plus d'une gorgée?** 1 Oui 2 Non -77 Je ne sais pas -88 Refus de répondre
Frequency Use Alcohol Freq.alc.use	*Programmer note: Ever.use.alc=1* **<u>In the last 12 months</u>, how often did you have a drink of alcohol that was more than just a sip?** 0 Not at all 1 Less than once a month	**<u>Au cours des 12 derniers mois</u>, à quelle fréquence avez-vous bu de d'alcool, qui était de plus d'une gorgée?** 0 Pas du tout 1 Moins qu'une fois par mois 2 Une fois par mois

	2 Once a month 3 2-3 times a month 4 Once a week 5 More than once a week -77 Don't know -88 Refuse to answer	3 2 à 3 fois par mois 4 Une fois par semaine 5 Plus d'une fois par semaine -77 Je ne sais pas -88 Refus de répondre
Frequency Use Alcohol 2 Freq.alc.use2	*Programmer note: Ever.use.alc=2-9* **In the last 12 months, how often did you have 5 drinks of alcohol or more on one occasion?** 0 I did not have 5 or more drinks on one occasion in the last 12 months 1 Less than once a month 2 Once a month 3 2 to 3 times a month 4 Once a week 5 More than once a week -77 Don't know -88 Refuse to answer	**Au cours des 12 derniers mois, à quelle fréquence avez-vous bu 5 verres d'alcool ou plus en une seule occasion?** 0 Je n'ai pas pris 5 verres ou plus en une seule occasion au cours des 12 derniers mois 1 Moins qu'une fois par mois 2 Une fois par mois 3 2 à 3 fois par mois 4 Une fois par semaine 5 Plus d'une fois par semaine -77 Je ne sais pas -88 Refus de répondre
Ever Use AmED Ever.use.amed	*Programmer note: Ask all* **Have you ever had alcohol and an energy drink (such as *Red Bull*, *Rockstar*, *Monster*, or another brand) on the same occasion (for example during a party)?** 1 Yes 2 No -77 Don't know -88 Refuse to answer	**Avez-vous déjà bu de l'alcool et une boisson énergisante (comme *Red Bull*, *Rockstar*, *Monster* ou une autre marque) à la même occasion (par exemple, durant une fête)?** 1 Oui 2 Non -77 Je ne sais pas -88 Refus de répondre
Frequency Use AmED Freq.use.amed	*Programmer note: Ask if ever.use.amed=1* **In the last 12 months, how often have you had alcohol and an energy drink on the same occasion (for example during a party)?** 0 Not at all 1 Less than once a month	**Au cours des 12 derniers mois, à quelle fréquence avez-vous bu de l'alcool et une boisson énergisante à la même occasion (par exemple, durant une fête)?** 0 Pas du tout 1 Moins d'une fois par mois

	2 Once a month 3 2-3 times a month 4 Once a week 5 More than once a week -77 Don't know -88 Refuse to answer	2 Une fois par mois 3 2 à 3 fois par mois 4 Une fois par semaine 5 Plus d'une fois par semaine -77 Je ne sais pas -88 Refus de répondre
(ever.type) Ever.type1 Ever.type2 Ever.type3 Ever.type4	*Programmer note: Ask all* **The next few questions ask about <u>different ways</u> of having alcohol and energy drinks.** **Have you ever had any of the following:** Select all that apply. [*Pre-coded checklist or yes/no for each option*] **1 an alcoholic energy drink <u>pre-mixed in a bottle or can</u>** (for example, *Rockstar+Vodka, Molson Kick, 3A.M.Vodka*, or others) **2 alcohol and an energy drink <u>that a bartender served you</u>** (for example, vodka with *Red Bull*, a *Jägerbomb,* or others) **3 alcohol and an energy drink <u>that you mixed together yourself</u>** (for example, vodka with *Red Bull*, a *Jägerbomb* or others) ***4*** **alcohol and an energy drink <u>on the same occasion, but NOT mixed together</u>**, such as having an energy drink before going to an event, and then having a beer or other alcoholic beverage later 5. None of the above [*Programmer: allow to select only if no options chosen above*] -77 Don't know -88 Refuse to answer	**Les questions suivantes portent sur <u>différentes façons</u> de consommer de l'alcool et des boissons énergisantes.** **Avez-vous déjà bu un des boissons suivants :** Choisissez toutes les réponses qui s'appliquent. **1 une boisson énergisante alcoolisée <u>pré-mixée en bouteille ou en cannette</u>** (par exemple *Rockstar+Vodka, Molson Kick, 3A.M.Vodka* ou autres) **2 de l'alcool et une boisson énergisante qu'<u>un barman vous a servi</u>** (par exemple de la vodka avec un *Red Bull*, un *Jägerbomb* ou autres) 3 **de l'alcool et une boisson énergisante <u>que vous avez mélangés ensemble vous-même</u>** (par exemple de la vodka avec un *Red Bull*, un *Jägerbomb* ou autres) 4 **de l'alcool et une boisson énergisante <u>à la même occasion, mais NON mélangés ensemble</u>,** tel que boire une boisson énergisante avant de sortir ou de se rendre à un événement, puis boire une bière ou une autre boisson alcoolisée plus tard 5. Aucune des réponses ci-dessus -77 Je ne sais pas -88 Refus de répondre
Frequency Use Type 1 Freq.type1	*Programmer note: Only ask if Ever.type1=1* **<u>In the last 12 months,</u> how often have you had an alcoholic energy drink <u>pre-mixed in a bottle or can</u>, such as *Rockstar+Vodka, Molson Kick,* or *3A.M.Vodka*?**	**<u>Au cours des 12 derniers mois</u>, à quelle fréquence avez-vous bu une boisson énergisante alcoolisée <u>pré-mixée en bouteille ou en cannette</u>, tel que *Rockstar+Vodka, Molson Kick* ou *3A.M.Vodka*?**

	0 Not at all 1 Less than once a month 2 Once a month 3 2-3 times a month 4 Once a week 5 More than once a week -77 Don't know -88 Refuse to answer	0 Pas du tout 1 Moins d'une fois par mois 2 Une fois par mois 3 2 à 3 fois par mois 4 Une fois par semaine 5 Plus d'une fois par semaine -77 Je ne sais pas -88 Refus de répondre
Frequency Use Type 2 Freq.type2	*Programmer note: Only ask if Ever.type2=1* **In the last 12 months, how often have you had alcohol and an energy drink that a bartender served you? (**For example, vodka with *Red Bull*, a *Jägerbomb* or others). 0 Not at all 1 Less than once a month 2 Once a month 3 2-3 times a month 4 Once a week 5 More than once a week -77 Don't know -88 Refuse to answer	**Au cours des 12 derniers mois, à quelle fréquence avez-vous bu de l'alcool et une boisson énergisante qu'un barman vous a servi?** (par exemple de la vodka avec un *Red Bull*, un *Jägerbomb* ou autres) 0 Pas du tout 1 Moins d'une fois par mois 2 Une fois par mois 3 2 à 3 fois par mois 4 Une fois par semaine 5 Plus d'une fois par semaine -77 Je ne sais pas -88 Refus de répondre
Frequency Use Type 3 Freq.type3	*Programmer note: Only ask if Ever.type3=1* **In the last 12 months, how often have you had alcohol and an energy drink that you mixed together yourself? (**For example, vodka with *Red Bull*, a *Jägerbomb* or others)**.** 0 Not at all 1 Less than once a month 2 Once a month 3 2-3 times a month 4 Once a week 5 More than once a week -77 Don't know -88 Refuse to answer	**Au cours des 12 derniers mois, à quelle fréquence avez-vous bu de l'alcool et une boisson énergisante que vous avez mélangés ensemble vous-même?** (par exemple de la vodka avec un *Red Bull*, un *Jägerbomb* ou autres) 0 Pas du tout 1 Moins d'une fois par mois 2 Une fois par mois 3 2 à 3 fois par mois 4 Une fois par semaine 5 Plus d'une fois par semaine -77 Je ne sais pas

		-88 Refus de répondre
Frequency Use Type 4 Freq.type4	*Programmer note: Only ask if Ever.type4=1* **In the last 12 months, how often have you had alcohol and an energy drink on the same occasion, but not mixed together,** such as having an energy drink before going to an event, and then having a beer or other alcoholic beverage later? 0 Not at all 1 Less than once a month 2 Once a month 3 2-3 times a month 4 Once a week 5 More than once a week -77 Don't know -88 Refuse to answer	**Au cours des 12 derniers mois, à quelle fréquence avez-vous bu de l'alcool et une boisson énergisante à la même occasion, mais non mélangés ensemble,** tel que boire une boisson énergisante avant de sortir ou de se rendre à un événement, puis boire une bière ou une autre boisson alcoolisée plus tard? 0 Pas du tout 1 Moins d'une fois par mois 2 Une fois par mois 3 2 à 3 fois par mois 4 Une fois par semaine 5 Plus d'une fois par semaine -77 Je ne sais pas -88 Refus de répondre
Offered Amed Offer.amed	*Programmer note: Only ask if Ever.amed.use=0* **Have you ever been offered alcohol mixed with an energy drink to try?** 1 Yes 2 No -77 Don't know -88 Refuse to answer	**Vous a-t-on déjà offert de l'alcool mélangé avec une boisson énergisante pour en faire l'essai?** 1 Oui 2 Non -77 Je ne sais pas -88 Refus de répondre
Susceptibility 1 Amed.try	*Programmer note: Only ask if Ever.amed.use=0* **Are you interested in trying alcohol mixed with an energy drink in the future?** 0 Definitely yes 1 Probably yes 2 Not sure 3 Probably not 4 Definitely not -77 Don't know -88 Refuse to answer	**Êtes-vous intéressé à essayer de l'alcool mélangé avec une boisson énergisante dans le futur?** 0 Certainement, oui 1 Probablement, oui 2 Pas sûr 3 Probablement pas 4 Certainement pas -77 Je ne sais pas -88 Refus de répondre

Susceptibility 3 Try.offer.amed	*Programmer note: Only ask if Ever.amed.use=0* **If one of your best friends were to offer you alcohol mixed with an energy drink, would you drink it?** 0 Definitely yes 1 Probably yes 2 Not sure 3 Probably not 4 Definitely not -77 Don't know -88 Refuse to answer	**Si un de vos meilleur(e)s ami(e)s vous offrait de l'alcool mélangé avec une boisson énergisante, la boiriez-vous?** 0 Certainement, oui 1 Probablement, oui 2 Pas sûr 3 Probablement pas 4 Certainement pas -77 Je ne sais pas -88 Refus de répondre
Friend Use Friend.AmED.use	*Programmer note: Ask all* **Of your five closest friends, how many have tried alcohol mixed with an energy drink?** None 1 friend 2 friends 3 friends 4 friends 5 friends -77 Don't know -88 Refuse to answer	**De vos cinq meilleurs amis, combien ont déjà essayé de l'alcool mélangé avec une boisson énergisante?** Aucune 1 ami(e) 2 ami(e)s 3 ami(e)s 4 ami(e)s 5 ami(e)s -77 Je ne sais pas -88 Refus de répondre
Reasons for Use Reason.AmED.use	*Programmer note: Only ask if Ever.amed.use=1* **Have you EVER had alcohol mixed with an energy drink for any of the following reasons?** Select all that apply. 1. To get drunk 2. To be able to drink more 3. To avoid a hangover 4. To stay alert for driving 5. To stay awake 6. To boost energy 7. For the taste	**Avez-vous DÉJÀ consommé de l'alcool mélangé avec une boisson énergisante pour l'une ou plusieurs des raisons suivantes?** Choisissez toutes les réponses qui s'appliquent. 1. Pour s'enivrer/se soûler 2. Pour être capable de boire davantage 3. Pour éviter une gueule 4. Pour rester alerte pour conduire 5. Pour rester éveillé 6. Pour augmenter/*booster* son énergie

	8. Someone offered it to me 9. Because my friends were drinking them 10. Curious/Try something new 11. Other → Please specify: [*open-ended*] 12. None of the above [*Programmer: allow to select only if no options chosen above*] -77 Don't know -88 Refuse to answer	7. Pour le goût 8. Quelqu'un me l'a offert 9. Parce que mes ami(e)s en buvaient 10. Par curiosité/Pour essayer quelque chose de nouveau 11. Autre → Veuillez préciser : _____ 12. Aucune des réponses ci-dessus -77 Je ne sais pas -88 Refus de répondre
Ever. AmED.loc1 Ever. AmED.loc2 Ever. AmED.loc3 Ever. AmED.loc4 Ever. AmED.loc5 Ever. AmED.loc6 Ever. AmED.loc7 Ever. AmED.loc8	*Programmer note: Only ask if Ever.amed.use=1* **Have you ever had alcohol mixed with an energy drink <u>in any of the following places:</u>** Select all that apply. [[*Pre-coded checklist or yes/no for each option*] 1 At work 2 At school 3 While driving 4 At home 5 At someone else's house 6 At a restaurant 7 At a bar/pub/nightclub 8 Somewhere else → Please specify: [*open-ended*] -77 Don't know -88 Refuse to answer	**Avez-vous déjà consommé de l'alcool mélangé avec une boisson énergisante <u>dans quelconque des endroits suivants</u>?** Choisissez toutes les réponses qui s'appliquent. 1 Au travail 2 À l'école 3 En conduisant 4 À la maison 5 À la maison de quelqu'un d'autre 6 Dans un restaurant 7 Dans un bar/pub/boîte de nuit 8 Ailleurs → Veuillez préciser : _____ -77 Je ne sais pas -88 Refus de répondre

Risk Behaviour		
CED.Alertness CED.alert	*Programmer note: Ask if (Ever.alc.use=1 AND CED.ever.use=1)* **During or after drinking alcohol, have you ever had an energy drink to be more alert so you could keep partying or stay out longer?** 1 Yes 2 No -77 Don't know -88 Refuse to answer	**En buvant ou après avoir bu de l'alcool, avez-vous déjà bu une boisson énergisante pour être plus alerte pour pouvoir continuer à fêter ou rester à l'extérieur plus longtemps?** 1 Oui 2 Non -77 Je ne sais pas -88 Refus de répondre

AmED.Drive AmED.drive	*Programmer note: Ask if (Ever.alc.use=1 AND CED.ever.use=1) AND age >15)* **After drinking alcohol, have you ever had an energy drink to be more alert <u>to drive</u>?** 1 Yes 2 No -77 Don't know -88 Refuse to answer	**Après avoir bu de l'alcool, avez-vous déjà bu une boisson énergisante pour être plus alerte pour <u>conduire/ être au volant</u>?** 1 Oui 2 Non -77 Je ne sais pas -88 Refus de répondre
Drunk.Driving Alcohol.drive	*Programmer note: Ask if age >15* **In the last 12 months, have you been in a car when the driver had been drinking alcohol?** 1 Yes 2 No -77 Don't know -88 Refuse to answer	**Au cours des 12 derniers mois, avez-vous circulé en voiture lorsque le conducteur avait bu de l'alcool?** 1 Oui 2 Non -77 Je ne sais pas -88 Refus de répondre

Product views		
	Programmer note: Make sure these images show up on screen in the size provided (same # of pixels). *Participants will be assigned to view one of 29 energy drink product conditions on the screen. Each participant should see both the 'EC#_Front' and 'EC#_Back' images from one of the 29 condition sub-folders located within the*	

	Experimental_Conditions folder.		

		
EC.interest	**Would you be interested in trying this product?** [1-10 scale with anchors range from "Not at all interested" to "Extremely interested"] -77 Don't know -88 Refuse to answer	**Seriez-vous intéressé à essayer ce produit?** [1-10 scale with anchors range from *Pas du tout intéressé* to *Extrêmement intéressé*] -77 Je ne sais pas -88 Refus de répondre
EC.safe	**Is this product safe for people your age to drink?** [1-10 scale with anchors range from "Not at all safe" to "Extremely safe"] -77 Don't know -88 Refuse to answer	**Est-ce que ce produit est sans danger pour les personnes de votre âge?** [1-10 scale with anchors range from *Pas du tout sécuritaire* to *Extrêmement sécuritaire*] -77 Je ne sais pas -88 Refus de répondre
EC.warning	[*Programmer*: *After pictures disappear from screen, participants not allowed to go back to that screen:*]	**S'il vous plaît décrire quelconque mise(s) en garde ou avertissement(s) qui est apparu sur la boisson énergisante**

	Please describe any health warnings or statements that appeared on the energy drink on the previous screen. If you remember more than one warning or statement, please describe as many as possible. [*Open ended, 800 character maximum*] -77 Don't know -88 Refuse to answer	**sur l'écran précédent. Si vous vous souvenez de plus d'une mise en garde ou avertissement, s'il vous plaît décrire autant que possible.** [*Open ended, 800 character maximum*] -77 Je ne sais pas -88 Refus de répondre

Socio-demographics		
Background	**The next few questions ask about you, and help us to get a picture of your background.**	**Les quelques questions suivantes portent sur vous, et nous aident à obtenir une idée de votre profil.**
Height	**It is helpful to know the height and weight of survey participants.** **How tall are you without shoes?** *Enter number*: _____ **feet** [numeric, 3-7] AND *Enter number*: _____ **inches** [numeric, 0-12] **OR** *Enter number*: _____ **cm** [numeric, 100-250] 77. Don't know 88. Refuse to answer	**Il nous est utile de connaître la taille et le poids des participants au sondage.** **Quelle est votre taille sans chaussures?** Indiquer le nombre: _____ **pieds** [numeric, 3-7] ET Indiquer le nombre: _____ **pouces** [numeric, 0-12] **OU** Indiquer le nombre: _____ **cm** [numeric, 100-250] -77 Je ne sais pas -88 Refus de répondre
Weight	**How much do you weigh without clothes or shoes?** *Enter number*: _____ **pounds** [numeric, 60-999] **OR** *Enter number*: _____ **kg** [numeric, 30-500]	**Quel est votre poids sans vêtements ni chaussures?** Indiquer le nombre: _____ **livres** [numeric, 60-999] **OU** Indiquer le nombre: _____ **kg** [numeric, 30-500]

	77. Don't know 88. Refuse to answer	-77 Je ne sais pas -88 Refus de répondre
Weight.behaviour	**Which of the following are you trying to do about your weight:** 1. Lose weight 2. Gain weight 3. Stay the same weight 4. Not trying to do anything about your weight 77. Don't know 88. Refuse to answer	**Parmi les énoncés suivants, qu'essayer vous de faire vis-à-vis votre poids?** 1. Perdre du poids 2. Prendre du poids 3. Maintenir mon poids 4. Je n'essaie de rien faire vis-à-vis mon poids 77. Je ne sais pas 88. Refus de répondre
Health.status	**Please indicate if you have either of the following health conditions**. Select all that apply. Heart condition Diabetes Neither of these -77 Don't know -88 Refuse to answer	**S'il vous plaît indiquer si vous avez l'une des conditions de santé suivantes.** Choisissez toutes les réponses qui s'appliquent. Maladie cardiaque Le diabète Aucun de ceux-ci -77 Je ne sais pas -88 Refus de répondre
Sleep Sleep.time	**Now a few questions about your sleep.** **How many hours do you usually spend sleeping in a 24 hour period, excluding time spent resting?** _____ hours [*numeric*] -77 Don't know -88 Refuse to answer	**Maintenant, quelques questions à propos de votre sommeil.** **Combien d'heures passez-vous à dormir dans une période de 24 heures habituelle, sans compter le temps passé à se reposer?** _____ heures [*numeric*] -77 Je ne sais pas -88 Refus de répondre
Sleep.trouble	**How often do you have trouble going to sleep or staying asleep?** 1. Never 2. Rarely	**À quelle fréquence avez-vous de la difficulté à vous endormir ou à dormir la nuit entière?** 1. Jamais 2. Rarement

	3. Sometimes 4. Most of the time 5. All of the time -77. Don't know -88. Refuse to answer	3. Parfois 4. La plupart du temps 5. Tout le temps -77 Je ne sais pas -88 Refus de répondre
Awake.difficult	**How often do you find it difficult to stay awake during your normal waking hours when you want to?** 1. Never 2. Rarely 3. Sometimes 4. Most of the time 5. All of the time -77. Don't know -88. Refuse to answer	**À quelle fréquence éprouvez-vous de la difficulté à rester réveillé pendant vos heures habituelles d'éveil lorsque vous le souhaitez?** 1. Jamais 2. Rarement 3. Parfois 4. La plupart du temps 5. Tout le temps -77 Je ne sais pas -88 Refus de répondre
Sports	**Do you watch or follow any extreme sports?** 1 Yes 2 No -77 Don't know -88 Refuse to answer	**Regardez-vous ou suivez-vous des sports extrêmes?** 1 Oui 2 Non -77 Je ne sais pas -88 Refus de répondre
school	**Are you in . . .** Grade 6 Grade 7 Grade 8 Grade 9 Grade 10 Grade 11 Grade 12 College University Other → Please specify: [*open-ended*] Not in school	**Êtes-vous en…** 6e année 7e année 8e année 9e année 10e année 11e année 12e année Au collège ou au Cégep À l'université Autre → Veuillez préciser : _____ Pas aux études

	-77 Don't know -88 Refuse to answer	-77 Je ne sais pas -88 Refus de répondre
School2	*Programmer note: Ask if school="Not in school" OR "Other"* **What is the highest level of formal education you have completed?** Less than high school High school diploma or equivalent Some technical / trade school or community college Completed technical / trade school or community college Some university, no degree Completed university degree Post-graduate degree -77. Don't know -88. Refused	**Quel est le plus haut niveau de scolarité que vous avez complété?** Moins que l'école secondaire Diplôme d'études secondaires ou l'équivalent Certaines études professionnelles ou collège communautaire, sans diplôme Diplôme d'études professionnelles ou collège communautaire complété Certaines études universitaires, sans diplôme Diplôme universitaire, études complétées Diplôme d'études supérieures -77. Je ne sais pas -88. Refus de répondre
School.grades	**On average, what marks [do/did] you usually get [when you were] in school?** Select ONE. [***Programmer****: Use "did" and "when you were" if school="Not in school"*] Below 50% (Mostly Fs) 50-59% (Mostly Ds) 60-69% (Mostly Cs) 70-79% (Mostly Bs) 80-89% (Mostly As or A+s) 90-100% (Mostly A+) -77. Don't know -88. Refuse to answer	**En moyenne, quelles notes [avez/aviez]-vous habituellement quand vous [êtes/étiez] à l'école?** Sélectionnez UNE réponse. Moins de 50 % (surtout des F) De 50 à 59 % (surtout des D) De 60 à 69 % (surtout des C) De 70 à 79 % (surtout des B) De 80 à 89 % (surtout des A ou des A+) De 90 à 100 % (surtout des A+) -77 Je ne sais pas -88 Refus de répondre
Education.father	**The next two questions are about your parents. By parents ("mother", or "father"), we mean whoever you consider your parents to be. They could be your birth**	**Les deux prochaines questions portent sur vos parents. Par parents (*mère* ou *père*), on entend les personnes que vous considérez comme vos parents. Il peut s'agir**

	parents, adoptive parents, stepparents or foster parents. **What is the highest level of education <u>your father</u> completed?** Did not attend high school Attended high school Graduated high school Attended college Graduated college Attended university Graduated university -77. Don't know -88. Refuse to answer	**de vos parents biologiques, vos parents adoptifs, vos beaux-parents ou de parents de famille d'accueil.** **Quel est le plus haut niveau de scolarité que <u>votre père</u> a complété?** N'a pas fréquenté l'école secondaire A fréquenté l'école secondaire A complété les études secondaires A fréquenté le collège/cégep A complété des études collégiales A fréquenté l'université A complété des études universitaires -77 Je ne sais pas -88 Refus de répondre
Education.mother	**What is the highest level of education <u>your mother</u> completed?** Did not attend high school Attended high school Graduated high school Attended college Graduated college Attended university Graduated university -77 Don't know -88 Refuse to answer	**Quel est le plus haut niveau de scolarité que <u>votre mère</u> a complété?** N'a pas fréquenté l'école secondaire A fréquenté l'école secondaire A complété les études secondaires A fréquenté le collège/cégep A complété des études collégiales A fréquenté l'université A complété des études universitaires -77 Je ne sais pas -88 Refus de répondre
Spending money	*Programmer note: only ask if age=12-19* **About how much money do you usually get each week to spend on yourself or to save?** Include all money from allowance and jobs. Zero $1 to $5 $6 to $10	**Combien d'argent recevez-vous chaque semaine, habituellement, pour vos dépenses personnelles ou pour épargner?** Inclure tout l'argent de poche ou d'un emploi. Zéro 1 à 5 $ 6 à 10 $

	$11 to $20 $21 to $40 $41 to $100 More than $100 -77 I do not know how much money I get each week -88 Refuse to answer	11 à 20 $ 21 à 40 $ 41 à 100 $ Plus de 100 $ -77 J'ignore combien d'argent je reçois chaque semaine -88 Refus de répondre
Province	**What province or territory do you live in?** Alberta British Columbia Manitoba New Brunswick Newfoundland and Labrador Northwest Territories Nova Scotia Nunavut Ontario Prince Edward Island Quebec Saskatchewan Yukon -88. Refuse to answer	**Dans quelle province ou territoire habitez-vous?** Alberta Colombie-Britannique Manitoba Nouveau-Brunswick Terre-Neuve-et-Labrador Territoires du Nord-Ouest Nouvelle-Écosse Nunavut Ontario Île-du-Prince-Édouard Québec Saskatchewan Yukon -88 Refus de répondre
Ethnicity	**People living in Canada come from many different cultural and racial backgrounds. Are you**… Select all that apply 1. White? 2. Chinese? 3. South Asian (e.g., East Indian, Pakistani, Sri Lankan)? 4. Black? 5. Filipino? 6. Latin American? 7. Southeast Asian (e.g., Cambodian, Indonesian,	**Les personnes vivant au Canada proviennent de divers groupes ethniques et culturels. Êtes-vous…** Choisissez toutes les réponses qui s'appliquent. 1. De race blanche? 2. Chinois(e)? 3. D'Asie du Sud (p. ex., Indien(ne), Pakistanais(e), Srilankais)? 4. De race noire? 5. Philippin(e)? 6. Latino-américain(e)? 7. D'Asie du Sud-Est (p. ex., Cambodgien(ne),

	Laotian, Vietnamese)? 8. Arab? 9. West Asian (e.g., Afghan, Iranian)? 10. Japanese? 11. Korean? 12. Other → Please specify: [*open-ended*] -77 Don't know -88 Refuse to answer	Indonésien(ne), Laotien(ne))? 8. Arabe 9. Originaire de l'Asie occidentale (p. ex., de l'Afghanistan, de l'Iran)? 10. Japonais(e)? 11. Coréen(ne)? 12. Autre → Veuillez préciser : _____ -77 Je ne sais pas -88 Refus de répondre
Aboriginal.status	**Are you an Aboriginal person, that is, North American Indian, Métis or Inuit?** 1 Yes 2 No -77 Don't know -88 Refuse to answer	**Êtes-vous une personne autochtone, c'est-à-dire, Premières Nations, Métis ou Inuit?** 1 Oui 2 Non -77 Je ne sais pas -88 Refus de répondre
Sensation seeking Sensation. seeking1	**Please indicate how much you agree or disagree with each of the following statements**. **I like to do frightening things. Do you…** 1 Strongly disagree 2 Disagree 3 Neither disagree nor agree 4 Agree 5 Strongly agree -77. Don't know -88. Refuse to answer	**S'il vous plaît indiquer à quel point vous êtes d'accord ou non avec chacun des énoncés suivants.** **J'aime faire des choses qui font peur. Êtes-vous…** 1 Pas du tout d'accord 2 Pas d'accord 3 Neutre 4 D'accord 5 Entièrement d'accord -77 Je ne sais pas -88 Refus de répondre
Sensation. seeking2	**I like new and exciting experiences, even if I have to break the rules. Do you…** 1 Strongly disagree 2 Disagree 3 Neither disagree nor agree 4 Agree	**J'aime les expériences nouvelles et excitantes, même si je dois aller contre les règlements. Êtes-vous…** 1 Pas du tout d'accord 2 Pas d'accord 3 Neutre 4 D'accord

	5 Strongly agree -77. Don't know -88. Refuse to answer	5 Entièrement d'accord -77 Je ne sais pas -88 Refus de répondre
Sensation. seeking3	**I prefer friends who are exciting and unpredictable. Do you…** 1 Strongly disagree 2 Disagree 3 Neither disagree nor agree 4 Agree 5 Strongly agree -77. Don't know -88. Refuse to answer	**Je préfère des ami(e)s excitants et imprévisibles. Êtes-vous…** 1 Pas du tout d'accord 2 Pas d'accord 3 Neutre 4 D'accord 5 Entièrement d'accord -77 Je ne sais pas -88 Refus de répondre

Feedback	
That's all the questions we have for you today. Is there anything else you'd like to tell us, or any answers that you would change in the survey? [*open-ended*] No, I have nothing to add	Ce sont toutes les questions que nous avons pour vous aujourd'hui. Est–ce qu'il y a autre chose que vous voudriez nous dire ou des réponses que vous voulez changer dans le questionnaire? [*open-ended*] Non, je n'ai rien à ajouter
Thank you for participating in our study – we appreciate your help. Please take a moment to go over the following information. - As mentioned earlier, we are interested in people's use of and opinions about energy drinks. - Participants were shown different types of energy drinks so that we can see whether the packaging design affects people's opinions of the	Merci de participer à notre étude – nous apprécions votre aide. S'il vous plaît prendre un moment pour lire les informations suivantes. - Comme mentionné plus tôt, nous nous intéressons à l'utilisation et aux opinions des personnes vis-à-vis les boissons énergisantes.

products. - Participants were asked about their use of energy drinks with alcohol to examine trends in use of mixing these products together among youth. - As a reminder, this study has been reviewed by and received ethics clearance through a University of Waterloo Research Ethics Committee. If you have any comments or concerns resulting from your involvement please contact either Dr. Maureen Nummelin, the Director, Office of Research Ethics, at 1-519-888-4567, ext. 36005 or maureen.nummelin@uwaterloo.ca, or Professor David Hammond at 519-888-4567 ext. 36462 or dhammond@uwaterloo.ca. - If you would like any further information about the study, including a copy of our findings when they become available, please contact Professor David Hammond at 519-888-4567 ext. 36462 or dhammond@uwaterloo.ca. - We really appreciate your participation, and hope that this has been an interesting experience for you.	- Différents types de boissons énergisantes ont été présentés au participants afin que nous puissions voir si le design de l'emballage influe sur l'opinion qu'on les personnes de ces produits. - Les participants ont été interrogés au sujet de leur consommation de boissons énergisantes avec de l'alcool pour examiner les tendances relatives au mélange de ces produits chez les jeunes. - Nous vous rappelons que cette étude a été examinée et a reçu une attestation de conformité par un comité du Bureau de l'éthique de la recherche de l'Université de Waterloo. Si vous avez des commentaires ou des préoccupations suite à votre participation veuillez communiquer soit avec D^{re} Maureen Nummelin, directrice, Bureau de l'éthique de la recherche au 519-888-4567 poste 36005 ou à maureen.nummelin@uwaterloo.ca, ou avec le professeur David Hammond au 519 888 4567 poste 36462 ou à dhammond@uwaterloo.ca. - Si vous souhaitez obtenir plus de renseignements au sujet de cette étude, y compris un exemplaire de nos résultats lorsqu'elles seront disponibles, veuillez contacter professeur David Hammond au 519 888 4567 poste 36462 ou à dhammond@uwaterloo.ca. - Nous apprécions sincèrement votre participation et nous espérons que cette expérience a été intéressante pour vous.

System messages and warnings	
Next	Suivant
Screen too small!	Écran trop petit!
This survey needs a certain amount a space in order to be effective and unfortunately your browser currently doesn't have enough.	Ce sondage a besoin d'une certaine quantité d'espace pour être efficace et malheureusement, votre navigateur n'en a présentement pas assez.
Please resize your browser window if possible or switch to another computer or device.	S'il vous plaît redimensionner la fenêtre de votre navigateur si possible ou changer d'ordinateur ou d'appareil.
If you're using your tablet in portrait mode, try rotating your device.	Si vous utilisez votre tablette en mode portrait, essayez de tourner votre appareil.
Feet must be between 3 and 7!	Les pieds doivent être compris entre 3 et 7!
Inches must be between 0 and 11!	Les pouces doivent être compris entre 0 et 11!
Cm must be between 100 and 250!	Les cm doivent être compris entre 100 et 250!
This survey is in progress and by leaving this site you will lose all your responses!	Ce sondage est en cours et en laissant ce site vous perdrez toutes vos réponses!
Please type your response in the box provided:	S'il vous plaît indiquez votre réponse dans la case prévue :

Appendix B. Age distribution among all respondents and AmED ever users

Age	All respondents (n=1989)	AmED ever users (n=502)
Mean (SD)	18.25 (3.7)	20.99 (2.5)
12 years	2.2 (44)	0.0 (0)
13 years	8.4 (168)	0.0 (0)
14 years	8.5 (169)	0.8 (4)
15 years	9.0 (180)	1.8 (9)
16 years	10.5 (208)	3.4 (17)
17 years	11.1 (220)	7.6 (38)
18 years	4.6 (91)	4.6 (23)
19 years	5.7 (113)	7.6 (38)
20 years	6.2 (124)	10.6 (53)
21 years	6.9 (138)	12.5 (63)
22 years	8.4 (167)	15.7 (79)
23 years	9.8 (194)	20.1 (101)
24 years	8.7 (173)	15.3 (77)