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MULTICENTRIC DRUG RESEARCH PROPOSAL

PERCEPTION OF HARMS AND BENEFITS ASSOCIATED WITH
MARIJUANA USE AMONG ADOLESCENTS WITHIN FOUR CARIBBEAN
AND FIVE LATIN AMERICAN COUNTRIES

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<td>Anti-Drug Unit</td>
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<td>CAMH</td>
<td>Centre for Addiction and Mental Health</td>
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<td>CARICOM</td>
<td>Caribbean Community</td>
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<td>CICAD</td>
<td>Inter-American Drug Abuse Control Commission</td>
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<td>CONADIC</td>
<td>National Council of Addiction of Mexico</td>
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<td>GDP</td>
<td>Gross Domestic Product</td>
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<td>NCDA</td>
<td>National Council on Drug Abuse of Jamaica</td>
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<td>NDACC</td>
<td>National Drug Abuse Control Council</td>
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<td>NIDA</td>
<td>National Institute on Drug Abuse</td>
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<td>OAS</td>
<td>Organization of American States</td>
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<td>PAHO</td>
<td>Pan American Health Organization</td>
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<td>SENAD</td>
<td>National Secretariat on Drugs in Brazil</td>
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<td>SICA</td>
<td>Central American Integration System</td>
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<td>UN</td>
<td>United Nations</td>
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<td>UNODC</td>
<td>United Nations Office on Drug and Crime</td>
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<td>USA</td>
<td>United States of America</td>
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<td>WHO</td>
<td>World Health Organization</td>
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Introduction

In most Latin American countries, the prevalence of marijuana use among secondary school students is increasing, while the prevalence of tobacco use remains high (Organization of American States - OAS, 2011). In Caribbean countries, marijuana use is more common than tobacco use among secondary school students (OAS, 2011).

A recent article published by the National Institute of Drug Abuse (NIDA) provides evidence on negative short and long-term effects of marijuana use on the health of adolescents (Volkow, Baler, Compton, & Weiss, 2014). Long-term adverse effects appear to be the consequence of heavy use and include risk of addiction, and altered brain development. The NIDA study was conducted to provide scientific evidence within the context of modifications to the legislative framework in United States, and the low perception of harm regarding marijuana use among adolescents (Volkow et al., 2014).

Research conducted in the United States has also revealed that a lower perceived risk of marijuana consumption leads to increased use. Some evidence suggests that decreased risk perception and increased availability may increase the consumption of marijuana among adolescents (United Nations Office of Drugs and Crime - UNODC, 2014). The new regulatory framework in United States (specifically in Colorado and Washington) and in Uruguay make the use of recreational marijuana legal under certain restrictions and may engender changes in adolescent drug use (UNODC, 2014). To date, no studies have explored the effects of these legislative changes on individuals and society, especially in adolescents.

In 2012, the global mortality rate related to drug use was 40 persons per million among the population (15-64 years); 3.5-7% of this population has used an illicit drug at least once, most often marijuana (UNODC, 2014). Marijuana is perceived by this
population as the illicit drug causing the least harm. Despite the perception of marijuana use as involving low risk, treatment admissions for marijuana users in Latin American and Caribbean countries have increased from 24 to 40% in recent years (UNODC, 2014).

The World Health Organization (WHO) has recognized that most health problems during adulthood are the consequences of health-compromising behaviours during adolescence, when the brain is still developing and acquiring skills for the future. Specifically, the morbidity rates related to many non-communicable diseases are linked to unhealthy behaviours during adolescence such as the use of tobacco, alcohol and psychoactive substances (WHO, 2013). Early and regular marijuana use predicts an increased risk of marijuana addiction. Such patterns also pose an increased risk for the use of other illicit drugs (Hall & Degenhardt, 2009). Individuals who initiate use in adolescence are approximately two to four times as likely to have symptoms of marijuana dependence within two years after first use compared with those that begin use adulthood (Chen, Storr, & Anthony, 2009).

Adolescents represent approximately 20% of the population in most countries and play important economic, educational and social roles in the future of their societies (WHO, 2013). This stage of life contributes to the development of personal identity, acquisition of skills and learning to differentiate between positive and negative behaviours. Adolescents are more prone to risk-taking behaviour. This is not necessarily an undesirable characteristic as the ability to take risk is needed to increase autonomy and decision-making (Breinbauer & Maddaleno, 2005).

Studies showed that sensation seeking, which peaks in adolescence, is associated with participation in a range of risky activities by adolescents, including using psychoactive substances (Hampson, Severson, Burns, Slovic, & Fisher, 2001).
Steinberg (2008) asserted that risk-taking increases between childhood and adolescence as a result of changes around the time of puberty in the brain’s socio-emotional system leading to increased reward-seeking, especially in the presence of peers, fuelled mainly by a dramatic remodelling of the brain’s dopaminergic system. The author also pointed out that risk-taking declines between adolescence and adulthood because of change in the brain’s higher reasoning control system which improve individuals’ capacities for self-regulation.

It is important therefore, to identify adolescents’ perception of the adverse effects and/or benefits of marijuana use. It is also necessary to assess adolescents’ intention to use marijuana, within the context of global discussions on regulatory changes. The CICAD/CAMH Capacity Building Program has developed the following multi-centric and multi-national project to address these issues in Belize, Brazil, Chile, Colombia, Dominican Republic, Jamaica, Mexico, St Kitts and Nevis, and Trinidad and Tobago.
Justification

According to the WHO Mental Health Plan 2013-2020, adolescents are among the most vulnerable groups in society with an increased risk of mental health problems and a risk of first exposure to substance use. More than 50% of mental health disorders in adults develop by the age of 14, so prevention and promotion strategies should be implemented among school-aged adolescents to teach them about the risks related to substance use (WHO, 2013). Within the context of drug use worldwide, especially among adolescents, the WHO developed the Global School-Based Student Health Survey, which has already been used by most of the participating countries involved in this multi-centric project.

Chile conducted the survey in 2013, and the data revealed that among youth aged 13-17, 24.7% had tried marijuana at least once; of these, 60.9% had first tried it before the age of 14 (Ministerio de Salud de Chile, 2013). Jamaica conducted the survey in 2010, and the results revealed that 79.9% of all students aged 13-15 had used drugs before the age of 14 (National Council and Drug Abuse, 2010). Trinidad and Tobago conducted the survey in 2011, and the results revealed that among youth aged 13-15, 7.4% had tried marijuana at least once; of these, 77.2% had first tried it before the age of 14 (Ministry of Health, 2011). Belize conducted the survey in 2011, and the results revealed that among the youth aged 13-15, 11.3% had tried marijuana at least once; of these, 77.3% had first tried before the age of 14 (Ministry of Health, 2011).

The high rates of adolescents’ first use of marijuana before age 14 is a growing concern, given that this age of onset is related with an increased risk of abuse and dependence in adulthood, compared with those who first tried marijuana after the age of 18 (UNODC, 2013). Some health risks associated with marijuana use are respiratory, motor, mental, and cardiovascular effects; it may also cause psychotic symptoms and
increase the risk of lung cancer, immune deficiency, and decreased fertility (OAS, 2013; UNODC, 2013).

According to the Organization of American States (OAS), two factors could explain the trend of marijuana consumption among adolescents: decreasing perception of risk related to experimenting with marijuana and easier access (OAS, 2013). Previous studies have reported that when the perception of risk declines, the use of marijuana increases and *vice versa* (Andersson, Miller, Beck, & Chomynova, 2009; Johnston, Miech, Bachman, & Schulenberg, 2014). One study reported that adolescents who perceived marijuana use as involving less risk were twice as likely to use marijuana (Lopez-Quintero & Neumark, 2010).

The proposed study will investigate how the perception of harm and benefits are related to marijuana use among adolescents and how regulatory changes may be affect the intention of marijuana use.
Background of Participating Countries

Belize

Belize (formerly British Honduras) is the only Commonwealth country and the only English-speaking country in Central America. By virtue of its geographical location and historical background, it is considered to be part of both Central America and the Caribbean. Therefore, it is part of both the Central American Integration System (SICA) and the Caribbean Community (CARICOM). It has a total area of approximately 23,000 square kilometers (km²): it shares border with Guatemala to the south and west, with Mexico to the north. The country has a population of 358,899 with a gender structure breakdown of 50.1% women and 49.9% men (Statistical Institute of Belize, 2014). Despite the many challenges facing Belizeans, the life expectancy is 73.9. The main ethnic groups in the country are Mestizo, Creole, Maya, and Garifuna. The literacy rate is 79.7% and the unemployment rate is 14.2%. The country has a Gross Domestic Product (GDP) per capita of USD $1.5 billion (2013), a GDP growth rate of 0.7% and an inflation rate of 1.3% (2013). The principal sectors of the economy are agriculture, agro-processing, and services, which primarily consist of tourism (Heusner & Leslie, 2002; Martin & Manzano, 2010; Statistical Institute of Belize, 2013).

Drug abuse has resulted in serious health problems and severe social decline in the Belizean society. Illicit drug use and addiction affect youth, students, and entire family units. Marijuana, alcohol and crack cocaine are the most commonly illicit drugs used in Belize. In recent times, marijuana industry became a major economic activity of the northern districts. Other factors contributing to further expansion of the marijuana industry in the country are Belize’s strategic location in the transhipment route; inadequate law enforcement resources; ready access to the cheap labour of Central
American refugees who work on the marijuana plantations; and open borders and large tracts of unpopulated areas (Jules, 1999). In 2011, the United States added Belize to the list of major illicit drug transit and major illicit drug producing countries (Department of State to Congress, 2011).

The National Drug Abuse Control Council (NDACC) is a department within the Ministry of Health, and coordinates drug demand reduction; the drug observatory; institutional cooperation, and program evaluation. In 2012, NDACC reported an increase in the use of marijuana, and crack cocaine remained the second most abused drug (Department of State to Congress, 2013).

Although few studies have been conducted on drug use among adolescents in Belize, a recent unpublished study (Briceño-Perriott, Olivera, & Vellos, 2014) on prevalence and pattern of drug use among third year high school students in Belize City indicated that alcohol (76.4%) and marijuana (31.1%) are the main drugs used by Belize City third year students and prevalence for both is high. Tobacco (cigarette) is also used but to a lesser extent than alcohol and marijuana. Prevalence for other illicit drugs is much lower than that for alcohol, tobacco and marijuana. Interestingly, there were no sex differences in frequency of drug use except for four drugs: tobacco, marijuana, inhalants and crack. The research findings also indicated that both male and female respondents use licit and illicit drugs at about the same rate.

Brazil

Brazil is located in the geographical centre of South America and borders ten countries: Uruguay, Argentina, Paraguay, Bolivia, Peru, Colombia, Venezuela, Guyana and Suriname, and with the French Guiana, an overseas department and region of France. The country has an area of 8,514,876,599 km² and approximately 202, 656, 788
inhabitants (Hb). The age structure of the population has the following range distribution: 49.35% males and 50.65% females (Central Intelligence Agency, 2014a). According to WHO (2011), life expectancy in Brazil is: males 71.0 yrs, females 77.8 yrs and total life expectancy is 74.3 yrs, which gives Brazil a World Life Expectancy ranking of 70. The country is divided into 26 states and one Federal District, and the official language is Portuguese.

Inequality and poverty are the main social problems in Brazil. On the one hand, in 2013 the GDP had a growth rate of 2.3%, with a stable economy for the past ten years (Central Intelligence Agency, 2014). On the other hand, there is a high rate of youth mortality and urban violence. UNODC (2012) data on drug-related mortality in 2011 revealed that Brazil had 439 deaths, and a rate of 3.3 per million aged 15-64 yrs.

In brief, although the main problematic drug use in Brazil is alcohol consumption, the agenda of Brazilian national policies is nowadays concerned primarily with eliminating crack use. The discourses and practices on the war on drugs are still prevalent among the general population and media. According to the national surveys, the most common legal drugs used among the general population in Brazil are alcohol and tobacco and among the illicit ones, the most used drugs are marijuana and cocaine.

The surveys on drug use in Brazil are supported by the National Secretariat on Drugs (SENAD), which is part of the Ministry of Justice, and addressed patterns and prevalence of drug use in different population. Some of the results obtained on the 2nd Survey on the Use of Psychotropic Drugs in the general population (Carlini et al., 2007) are that 12 million Brazilians (22.8%) between 12 and 65 years old used a drug (except alcohol and tobacco) in their lifetime. Alcohol (74.6%) and tobacco (44%) were the most commonly used legal drugs; marijuana (8.8%) and cocaine (2.9%) were the most commonly used illicit drugs.
Briefly, the results of the recent survey on drug use among high school students conducted in 2010 (Carlini, Noto, & Sanchez, 2010) revealed that the first use occurred at 10 years old (lowest age observed). Among the students, 22.6% used a psychoactive substance (except alcohol and tobacco) in their lifetime, and alcohol was the most commonly used drug. Inhalants (8.1%), marijuana (5.8%), tranquilizers/sedatives (4.6%), cocaine (2.8%), amphetamine (2.1%), tobacco (1.9%), and crack (0.7%) were the other drugs used.

Finally, drug use has decreased the life expectancy of college students, making them at risk for: car accidents (associated with driving under the influence), interpersonal violence, risky sexual behaviour (as higher number of sexual partners and inconsistent use of condoms are associated with the use of psychoactive drugs, lower academic performance, trouble sleeping, changes in eating habits, decreased athletic performance, among other risks (Andrade, Duarte, & Oliveira, 2010).

Chile

Chile is located in the south-western of Latin America, with Peru to the north, the South Pole in the southern zone, Argentina to the east, and the Pacific Ocean to the west. Its total land area is 2,006,096 km$^2$, including Continental, Antarctic, and Insular territories. The official language is Spanish. The GDP of the country is 4.4% (Banco Central de Chile, 2014). In 2013, it had an estimated population of 17,556,800 Hb, with an average population density of 831.6 Hb/km$^2$. Approximately 87% of the population is concentrated in urban areas. The distribution by sex is 49.49% male and 50.51% female. In terms of age, 21.5% of the population is younger than 15, and 14.05% is older than 60. A clear aging trend has been observed in recent years, and the average life expectancy is 79.1 yrs (Instituto Nacional de Estadística, 2013). Public health
studies reveal increased morbidity due to chronic diseases and some associated risk factors such as alcohol and tobacco consumption.

In addition, the country’s health strategy, including recommendations for health policies considering alcohol, tobacco and illicit drugs (Ministerio de Salud de Chile, 2010). Additional strategies are defined by the National Service for Prevention and Rehabilitation for Drugs and Alcohol Consumption (SEND A), which is the agency under the Ministry of Interior and National Security, responsible for generating the information, defining and implementing drug policies (SEND A, 2011).

Among Chile’s general population, most drug problems involve legal substances (alcohol and tobacco). Over the last 10 years, consumption among young people has been declining (59.5% to 40.8% last month alcohol use, and 30.6% to 21.9% in tobacco consumption). A WHO study reported that in Chile are more women aged 15 years and older that smoke tobacco than any other country in Latin America (OMS, 2010), and that Chilean girls aged 13-15 yrs smoke more tobacco that any other group in that age range worldwide (39, 8%).

Although the prevalence of alcohol consumption is decreasing, Chileans consume more alcohol than any other group in Latin America (13.3 litres/year for men and 5.5 litres/year for women) (WHO, 2014). Marijuana is the most commonly used illicit drug (7.1% of the general population, 17.5% of those aged 19-25). Cocaine and “pasta base” (cocaine paste) use has remained stable in recent years (0.9%), but is highly addictive and is more often by law offenders. More pasta base consumption is observed among individuals in lower socio-economic levels, whereas marijuana use does not differ by socio-economic level (SEND A, 2013).

In the 10th National Study of Drugs in School Population in 2013 revealed that 30.6% of students between the ages of 13 to 17 reported smoking marijuana at least
once a year, the percentage increased from 2011 (19.5%). Perception of risk of frequent marijuana use decreased to 21.1% in comparison with 48% in 2011 study; 62.1% of the adolescents perceived that most youth smoke marijuana, and 54.2% stated that you can stop using it at any time; 49.2% believe that smoking marijuana once or twice a year is not harmful (SENDA, 2014).

**Colombia**

Colombia has a population of approximately 47,682,316 Hb (49.4% men, 50.6% women), with an area of 1´141,748 Km² and it is divided into 32 departments. It borders with Panama, Ecuador, Peru, Brazil and Venezuela and the official language is Spanish (Departamento Administrativo Nacional de Estadística-DANE, 2014). Colombia is an upper-middle income country with a GDP of US $ 378.1 billion; in 2013 a growth of 4.3% in its economy was reported (World Bank, 2014). Currently, Colombia is considered the fourth nation with the highest economy growth in the South American region.

In 2012, the distribution of population by age was 27% for 15 years and younger, 16% for 16 to 24 years, 42% for 25 to 54, 8% for 55 to 64 years old, and, 7% for 65 and over. Life expectancy is 75 years (DANE, 2014; Ministerio de Salud y Protección Social, 2013).

With respect to morbidity, it was reported by the Ministerio de Salud and Protección Social (2013) that gastrointestinal diseases with an infectious origin have the highest prevalence while diseases of circulatory system are the principal causes of mortality in men and women. External causes (e.g., transport accidents, legal intervention and war, accidental injuries, intentional self-harm) were the second cause
of deaths in men; in women these were classified in the group of “other diseases” by the International Statistical Classification of Diseases (ICD-10).

The Colombian policy on drugs has two main pillars: reducing supply and reducing demand. The Ministry of Justice and the Ministry of Health and Social Protection are the responsible for implementing the policy (Ministerio de la Protección Social, 2007, 2008).

A recent study on psychoactive substance use in Colombia revealed that alcohol is the most commonly used drug (lifetime prevalence of 86%, 61% in the past year, 35% in the past month). Tobacco is the second most commonly used drug (42% lifetime, 16% past year, 13% past month), followed by marijuana (11% lifetime, 3.2% past year, 0.6% past month). The study also revealed a significant increase in lifetime use of any illicit substance (12.2% in 2013 compared with 8.8% in 2008) (Ministerio de Justicia y del Derecho y Ministerio de la Protección Social, 2013).

With regard to students (grades 6-11), a recent study revealed that alcohol is the most commonly used drug (63% lifetime, 56.7% past year, 39.8% past month) with an average onset of 12 years. Tobacco is the second most used substance (24% lifetime), followed by marijuana (7% lifetime). The study revealed that 12.1% of the students had used an illicit drug in their lives (Ministerio de Justicia y del Derecho, Ministerio de Educación Nacional, y Ministerio de Salud y Protección Social, 2011).

With regard to perception about the risks of marijuana use, the last national study revealed that 91% of the general Colombian population considered frequent use of marijuana to be highly risky, and 72% considered experimenting with marijuana to be highly risky, while 65% of the adolescent population considered marijuana consumption highly risky (Ministerio de Justicia y del Derecho y Ministerio de la Protección Social, 2013). Some evidence suggests that among the Colombian
adolescent population, perceiving marijuana as involving little risk is associated with having used, or intending to use marijuana (López-Quintero & Neumark, 2010; Trujillo, Forns, & Pérez, 2007). Trujillo et al. (2007) focused on a sample of adolescents from Bogota and reported that learning about the physical risk of marijuana use had little effect on the consumption habits.

**Dominican Republic**

Dominican Republic territory is 48,310.97 km², and a population of 9,445,281 Hb, 50.2% men and 49.8% women (Oficina Nacional de Estadística, 2010). The life expectancy is 72 years old (WHO, 2012). The official language is Spanish. The GDP is US$5,822 per capita with an annual growth rate of 1.2% (Banco Central de la República Dominicana, 2014). The country borders with the Atlantic Ocean to the north that separates it from the Turks and Caicos Islands, with Mona Channel to east which separates it from Puerto Rico, the Caribbean Sea or the West Indies to the south, and with Republic of Haiti to west (Oficina Nacional de Estadística, 2010).

According to the most recent study of drug use among the general population, conducted in 2010, lifetime prevalence for illicit substances was: tranquilizers 2.6%, marijuana 2.3%, 1.1% cocaine, and heroin 0.1%. With regard to legal substances, lifetime prevalence rates were 80.2% with 20.0% for alcohol and snuff tobacco. Among the population aged 12-17, the lifetime prevalence rates for psychoactive drug use was 1.2%, with marijuana as the most commonly used drug (0.8%), followed by tranquilizers (0.2%) and cocaine (0.2%). According to this study, 91.6% of adolescents aged 12-17 years perceived a great risk of harm smoking marijuana once or twice a week, yet 93.7% smoked marijuana three or more times per week (Asociación
The most recent study of secondary school students, conducted in 2008, reported the following lifetime prevalence rates: tranquilizers 12.8%, stimulants 9.1%, marijuana 1.7%, inhalants 1.1%, crack 0.7%, ecstasy 0.5% and heroin 0.2%. Lifetime prevalence of alcohol consumption and snuff were 63.8% and 10.9%, respectively (Consejo Nacional de Drogas, 2009).

The National Drug Council (CND), an agency of the Presidency of the Republic, is responsible for coordinating the planning and implementation of preventive programs of drug use, and action to treatment, rehabilitation and social reintegration. The country has zero tolerance policy for drug trafficking and use of psychoactive substances.

**Jamaica**

Jamaica is an island in the Caribbean, located in the Great Antilles. It is the largest English-speaking Caribbean island with an approximate population of 2.8 million. The island is approximately 11,242 km\(^2\) of land mass (Class, Cavagnero, Rajkumar, & Ferl, 2014; National Council on Drug Abuse, 1997). A breakdown of the population by sex indicates 49% are male and 51% are female (Statistical Institute of Jamaica, 2014). According the Central Intelligence Agency World Factbook (2014b) the average life expectancy in Jamaica stands at approximately 73.4 years, with females having 75.1 years and males having a lower life expectancy of 71.8 years.

With regard to GDP, the country continues to derive most of its foreign exchange from tourism, remittances, and bauxite/alumina production. Nevertheless, in the fiscal year 2013/2014 the economy grew by 0.9% (Statistical Institute of Jamaica, 2014).
According to Haisley-Jackson (2013) Jamaica’s proximity to both North and South America made it a popular spot for the passage of drugs, especially marijuana and cocaine. According to University of West Indies Consulting (2012), the government spent high amounts of money to address substance abuse for “activities geared at illicit drug demand reduction as well as medical expenses and the value of lost productivity and lives as a result of substance use” (p. iv). “The overall economic cost to Jamaica in relation to substance abuse for the year 2010 totalled J$3,632,139,180 or US$ 41,748,726” (p. 17).

With regard to drug use among Jamaican adolescents, CICAD (2011) comparative analysis of drug use in Caribbean Countries, revealed the following rates for alcohol consumption: 66% (lifetime); 47.03% (past year) and 33.38 % (past month). Past year prevalence rates of alcohol (55.16%) were higher among students aged 15-16 compared to in those aged 17+ (53%). The rates for cigarette use among adolescent was: 24.61% lifetime; 8.37% past year, and 4.44% past month. For marijuana, the prevalence rate among adolescent was: 21.56% lifetime; 12.04% past year and 7.06% past month respectively. Marijuana use was higher among adolescents aged 17+ (15.20% past year) compared to adolescents aged 15-16 years (14.67% past year). One in five students who were current marijuana users were at high risk for marijuana misuse (NCDA, 2013). A comparative review of the years 2006 and 2013 revealed that while alcohol and marijuana use among Jamaican adolescents 13-17 have relatively constant, lifetime use of cigarettes has increased by 3%. Inhalant use has decreased from 25.5% to 13.3%. Males are still more likely to use marijuana, alcohol and cigarettes, while females are still more likely to use inhalants. With regard to age at first use, children as young as 10 had used inhalants, and children as young as 11 had used tranquilizers.
Little research has been conducted on perception of harm, benefits and intention to use marijuana among adolescents in Jamaica. However, marijuana is the most abused substance among the adult population. According the Ministry of Health, 634 users accessed clinics in 2006: most of these (n= 386) were aged 20-34. Alcohol is an intractable problem in Jamaica: seven out of ten Jamaicans have tried alcohol, and an estimated 93,000 Jamaicans have a problem with alcohol and need of care and treatment. Finally, an estimated 12% of the Jamaican population uses tobacco (Ministry of Health of Jamaica, 2006).

**Mexico**

Mexico has an area of 5,114, 295 km², and borders the US to the north and Guatemala and Belize in the south. According the most recent Population and Habitation Census, Mexico had 112, 336, 538 Hb, 51.1% female and 48.9% male. Literacy, rates are poor: 7 of every 100 people above the age of 15 cannot write or read, and the national average educational attainment is second year of high school. The speaking language is Spanish although 6.9 million (6.6%) of the population speak one of the 89 Indigenous languages that exist in the country: of this population, only 72% are literate (Instituto Nacional de Estadistica y Geografía, 2010).

With respect to economy, in 2013 the GDP in the country increased by 1.2%; the services and industry sector comprise 96.4% of this increase (Central Intelligence Agency, 2014c)

In the health area, life expectancy increased from 74 to 75 years from 2000 to 2014, women live longer than men, and have an average life expectancy of 77 years (Instituto Nacional de Estadistica y Geografía, 2014). For those aged 15-44, the principal causes of death are violent incidents, accidents and non-communicable diseases such as
cirrhosis and cancer, and HIV (Instituto Nacional de Estadística y Geografía, 2013), many of which can be relate to the acute and chronic consequences of the consumption of licit and illicit drugs.

The National Healthcare Plan 2013-2018 included the strategy: to implement actions to prevent and control addictions. This strategy involves various components, such as consolidating a national network for the treatment and prevention of addictions and to promoting epidemiological vigilance and research in this field (Gobierno de México, 2014). The National Council of Addiction (Consejo Nacional de Adicciones CONADIC) is responsible for the prevention, regulation and eradication of the drug problem. Mexico is also a member of CICAD, and its regulatory norms to guide the approach to drug use and abuse include the Official Mexican Standard NOM-028-SSA2-2009 for Addiction Prevention, Treatment and Control.

The government’s actions are intended to respond to trends in substance use. For instance, Mexico’s most recent National Addiction Survey revealed that the perception of harm of alcohol intake is decreasing, and the social acceptance is increasing. Prevalence rates for all drugs are higher among men than women, although the consumption has been increasing among women, and these women are still less likely to seek treatment (Instituto Nacional de Psiquiatría Ramón de la Fuente Muñiz, Instituto Nacional de Salud Pública, & Secretaría de Salud, 2012a).

According to the Epidemiological Surveillance Information System on Addictions, 24.3% of the minors in Juvenile Courts had committed the crime under the influence of a drug. Of these, 68.1% referred to habitually using a drug: the most common was marijuana at 35% (Instituto Nacional de Psiquiatría Ramón de la Fuente Muñiz et al., 2012c).
The Mexican population aged 12-17 includes 1.7 million cigarette smokers: 22.2% of all adolescents in Mexico have smoked tobacco. The average smoking onset age is 14, and their home is the principal place of exposure to tobacco smoke (Instituto Nacional de Psiquiatría Ramón de la Fuente Muñiz et al., 2012b).

With regard to illicit drug use, 1.5% of those aged 12-17 reported using an illicit drug during the previous year: 1.3% had used marijuana, 0.4% had used cocaine. With regard to sex differences, 64.1% of male adolescents and 70% of female adolescents said they had participated in a prevention program, and most of these took place at their school (89%). However, the effects of these programs are not monitored. The average age for the first intake of an illicit drug is 20 years for women and 18 years for men (Instituto Nacional de Psiquiatría Ramón de la Fuente Muñiz et al., 2012c).

Since 2002, the northern region of the country has had the highest prevalence rates in the consumption of all drugs. The Observatory of Addiction in the state of Baja California monitors this problem. According to its most recent report, 35.54% of the population had used drugs in the previous 30 days and 41.46% had used drugs in the previous 12 months. Over the previous 30 days, alcohol was the most consumed drug (82.2%), followed by tobacco (41.79%) and marijuana (4.95%). The city of Mexicali had the highest prevalence rate of drug use in Baja California (Gobierno del Estado de Baja California, 2012).

A Mexican study about perception of risk and drug use among high school students found a statistically significant relationship between the consumption of alcohol, tobacco, and marijuana and how adolescents perceived the risks of these drugs; with less perception of risk there is an increase in the consumption of this substances (Alvarado, Lucero, & Salinas, 2011). Another study conducted in Mexico City involving students of the same age reported that students perceived some illicit drugs,
like marijuana to involve less risk than alcohol or tobacco (Villatoro et al., 2011). To date, no studies have explored these perceptions of harm and benefits in Baja California.

Saint Kitts and Nevis

The Federation of St. Christopher (St. Kitts) and Nevis is part of the Leeward Islands, located in the north-east region of the Caribbean archipelago. The 2011 Population and Housing Census Preliminary Report states that the twin-island state has an estimated total population of 46,204 with 34,789 persons residing in St. Kitts and 11,415 persons residing in Nevis. The sex ratio is 96.91 (the number of males to every 100 females) with the population comprising of 49.2% males and 50.8% females (St. Kitts and Nevis Statistical Department, 2011).

St Kitts and Nevis is a very open, middle income economy with tourism as the main economic activity. The Federation has been experiencing continued sluggish economic growth, which is exacerbated by a high external debt stock: 154% of its GDP at end of 2011 (International Monetary Fund, 2012). The Federation’s unemployment rate, as recorded in 2007, was 5.1% with relatively equal disbursement between men and women (Pan American Health Organization, 2012). In 2007/2008, the national poverty rate was 23.7% for St. Kitts and 15.9% for Nevis (Caribbean Development Bank., 2009). In 2009, the literacy rate was reported at 97.8%, which can be attributed to very comprehensive educational programs, from early childhood to adult, geared towards ensuring high literacy rates. Secondary education is the highest educational level achieved by most of the heads of households in St Kitts (George, 2011).

In St. Kitts and Nevis, the life expectancy at birth is 75.1 with the life expectancy for males and females are 72.7 years and 77.5 years, respectively (IndexMundi, 2013). De La Haye and Portilla (2010) reported that in St. Kitts and
Nevis, obesity and substance abuse are the two main health issues for those aged 15-19 and 20-24 years. According to their report, adolescents and adults use illicit and legal drugs, with alcohol and marijuana as the most commonly used drugs. With regard to alcohol use among adults aged 25-64, the one-month prevalence was 44.7% for men and 14.5% for women. In the same age group, 16.6% of men and 1.1% of women reported using tobacco. A 2012 survey of prisoners in St Kitts and Nevis (CICAD, 2012) revealed that most had used marijuana (68%) or alcohol (62%), followed by tobacco (25%), crack (5.6%), and other illicit drugs (8%).

The results of the CICAD 2013 Secondary School Drug Prevalence Survey (CICAD, 2013) indicate that students aged 13-17, generally perceive frequent use of drugs to be very harmful to health: 50% perceived frequent consumption of marijuana as very harmful. Perception of harm increased slightly with age. However, 10% perceived frequent marijuana consumption as not harmful. With regard to the harmfulness of marijuana when used sometimes, 29.4% perceived marijuana as being very harmful, 16% as not harmful, and 22.6% as moderately harmful. In total 24% of the students had used marijuana at least once: this represents a 10% increase compared to results of the 2006 survey (MacLachlan-Moore, 2006). Approximately 45% of the male and 55% of female students perceived frequent marijuana use as harmful. Interestingly, the average age for first use of marijuana was 12 years. There is a dearth of studies conducted in St. Kitts and Nevis investigating the perception of harm and/or benefits of marijuana use among the general population and/or adolescents.

**Trinidad and Tobago**

Trinidad and Tobago is a twin-island republic in the Caribbean archipelago. It has an area of 5,128 km², and its official language is English. Trinidad and Tobago has
mixed ethnic, religious and cultural groups with East Indians and Africans making up the largest sub-groups. According to the most recent census, the total population was 1, 328,019 Hb and is roughly estimated at 50/50 between males and females (Central Statistical Office, 2013).

The Central Intelligence Agency: The World Fact Book (2014d) states that the life expectancy at birth is 72.3 years with 69.4 years for males and 75.2 years for females. The birth rate stands at 13.8 births/1000 while the death rate is 8.48 deaths/1000. The infant mortality rate is estimated at 24.82 deaths/1000 live births.

The economy of Trinidad and Tobago leans less heavily on tourism as do other countries in the English speaking CARICOM. It is fuelled by oil and natural gas. This industry accounts for 40% of the GDP and 80% of exports. The tourism aspect is more prevalent on the island of Tobago (Central Intelligence Agency, 2014d).

The Ministry of National Security is responsible for drug abuse and addiction issues, and the National Drug Council is the specific organization that handles different components of drug addiction and abuse. It is currently using a National Anti-Drug plan that involves five key areas: institutional strengthening, reducing demand for drugs, reducing the supply of drugs, research, and monitoring/evaluation. To date, little has been done in the area of harm reduction. Other agencies involved in combating drug abuse and addiction include the National Alcohol and Drug Abuse Prevention Program (NADAPP) and The Strategic Services Agency (National Drug Council, 2012).

The location of Trinidad and Tobago increases the likelihood of it acting as a drug transhipment hub to other countries (like the US) from Latin America/South America. According to the National Anti-Drug Plan, the main drug being produced in the country is marijuana. The most commonly used drugs include alcohol, cigarettes,
marijuana and cocaine (including crack cocaine). Other drugs like heroine, ecstasy, solvents and pharmaceuticals are also used.

According to Degenhardt and Hall (2012) an estimated 1.6-7.6% of persons use marijuana in the Caribbean region. The disability adjusted life years (DALYs) for marijuana is 0.2% and it is associated with effects such as motor vehicle accidents, drug induced-psychotic symptoms, risk of dependence, and psychotic disorders. The exact mortality and morbidity for Trinidad and Tobago as it relates to drug use/dependence is difficult to estimate however the phenomenon is directly (or indirectly) related to mental, social and physical health issues.

According to the most recent secondary school survey (OAS/CICAD, 2010), the prevalence of alcohol use was 82.08% (lifetime), 62.6% (past year), and 48.23% (past month); the prevalence of tobacco use was 28.86% (lifetime), 11.36% (past year), and 5.61% (past month); and the prevalence of marijuana was 12.09% (lifetime), 6.44% (past year), and 2.70% (past month). The survey also revealed that marijuana use among adolescents is related to behavioural problems and repeated years in school, and the 14.39% of the students reporting easy access to the drug.

There is a lack of current research on adolescents’ perception of harms and benefits of marijuana use in Trinidad and Tobago. However, the National Drug Council is currently conducting an online survey on attitudes towards marijuana which includes the view of adolescents. Nevertheless, some previous studies highlighted that adolescents use drugs (including marijuana) for different reasons. In one analysis Riley (2008) found that adolescents that have been admitted to juvenile delinquency facilities use drugs for the following reasons: abuse, peer pressure, family stress and financial stress. He also found that 26.6% of respondents at one particular institution initiated
drug use as early as age 5 and the messages that adolescents receive at home or through the media influences their perception of a drug.
Literature Review

Marijuana use and adolescence

The World Health Organization (WHO) defines adolescence as the stage between 10-19 years. However, there is no strict timeline for completion of the maturation process that defines adulthood (WHO, 2014). Adolescence is a stage of life characterized by physical, psychological and social transitions occur in children in order to develop their identity, autonomy and maturity that define them as adults.

Although puberty is considered the starting point to the process of adolescence, it is important to highlight that being an adolescent varies across cultures and eras. This term has often been understood as a period of radical transformations, which may cast adolescents in relationships outside of their family circle (Macedo & Conceição, 2013).

During this critical period, developmental changes can affect how adolescents perceive risks, act, see the future and think about the world. At this stage, different clinical manifestations can appear, leading to illnesses, such as eating disorders or depressive symptoms, which added to the impact of all these changes and increase the risk of substance use, self-injury and disruptive behaviour (Chung, 2008).

Drug issues among adolescents have been studied extensively in many different countries and according to this research, the most common substances used at this age are alcohol, tobacco and marijuana (Johnston, O’Malley, Miech, Bachman, & Schulenberg, 2014; Latimer & Zur, 2010; Moss, Chen, & Yi, 2014; UNODC, 2013).

The tendency towards marijuana use has increased in the last few years. The average age of onset lies between 12-15 years in different countries and there is an inverse relationship with the perception of harms that these adolescents have regarding its use (Johnston et al., 2014).

Several research studies show that the most common onset of drug use occurs
during the passage from childhood to adolescence, either as mere experimentation, occasional use, abuse or misuse (Marques & Cruz, 2000; Schenker & Minayo, 2005). The reason why adolescents start using drugs is not easy to determine. The question is very complex and involves several variables. As Olievenstein (1990) pointed out, the drug addiction phenomenon must be studied through a complex formulation with at least three main terms: the substance, the individual and the context. The relationship among these terms leads to a huge amount of possible configurations that must be taken into account in order to explain the meaning of using substances.

The use of drugs among adolescents can be related to a plethora of reasons, such as: socialization strategy; an attempt to acquire a group identity; a way of occupying spare time; seeking of pleasure or relief to pain, anxiety, bad feelings and thoughts; a need to satisfy sensation seeking and curiosity; a way to challenge the current law or the status quo; a path to achieve psychical states of mind that allow productive thinking/creative process, a stimulus to create courage to perform some action; an escape from reality; a route to transcendent experiences, among other reasons. Therefore, one cannot deny that people (and in this case adolescents) use drugs because they perceive (or gain) benefits from them (Oliveira & Conceição, 2008).

According to Hawkins, Catalano, and Miller (1992), precursors of drug and alcohol problems have been characterized as risk factors for drug abuse. Risk factors are associated statistically with an increased probability of drug abuse. Furthermore, risk factors for drug use are characteristics or attributes of an individual, group or social interaction environment that contribute to a greater or lesser degree, to increase the likelihood of such use. There is no single determinant of drug use among adolescents (Chakravarthy, Shah, & Lotfiipour, 2013; Kliewer & Murrelle, 2007).
The pattern of adolescent substance use can be framed by situating the possible risk and protective factors in different domains of a person's life. Thus, for each domain of an adolescent’s life, there may or may not be risk factors, as well as protective factors for use. It is important to note that these risk factors do not occur in a sealed or static form. There is considerable intersectionality and variability of influence among them.

Risk and protective factors can be identified in all domains of person’s life (Hawkins, 1999):

1) Individual: Alienation and rebelliousness, early initiation of the problem behaviour, constitutional factors.
2) Peers: Friends who engage in the problem behaviour, favourable attitudes toward the problem behaviour.
3) Family: Family history of the problem behaviour, family management problems, family conflict, favourable parental attitudes and involvement in the problem behaviour.
4) School: Early and persistent anti-social behaviour, academic failure beginning in late elementary school, lack of commitment to school.
5) Community: Includes the availability of drugs, availability of firearms, community laws and norms favourable toward drug use, firearms and crime; media portrayals of violence; transitions and mobility; low neighbourhood attachment and community disorganizations, extreme economic deprivation.

This study concentrates on the effect of some risk factors. These include the intention to use marijuana in the future, the low perception of harm of using marijuana, and the perception of having many peers/colleagues that are marijuana users. Thus, the
study aims to shed light on the risk factor associated with the perception of harm and benefits of using marijuana among adolescents.

**Harms and benefits of marijuana use**

Marijuana use has been associated with substantial adverse effects, some of which have been determined by well designed research (Volkow et al., 2014). Benefits related to medical marijuana use have been described by many authors in other studies, which will be highlighted in this review.

Considering the debate generated by new regulations and intentions to change policies in some countries where marijuana is illegal or criminalized, and the lack of conclusive information about benefits and harms, it is necessary to carefully analyze the available information on this topic before making a decision about legalization of marijuana.

**Marijuana and addiction**

Despite some contentious discussions regarding the addictiveness of marijuana, some evidence indicates that long-term marijuana use may lead to addiction (Budney, Roffman, Stephens, & Walker, 2007; Volkow et al., 2014). Research results show that approximately 9% of those who experiment with marijuana will become addicted (Lopez-Quintero et al., 2011). According to the 2012 National Survey on Drug Use and Health (USA), an estimated 2.7 million people aged 12 years and older met the Diagnostic and Statistical Manual of Mental Disorders, 4th edition (DSM-IV) criteria for dependence on marijuana, and 5.1 million persons met the criteria for dependence on any illicit drug (Lopez-Quintero et al., 2011). The number goes up to about one in six among those who started using marijuana as adolescents and to 25 to 50% among
those who smoke marijuana daily (Hall & Degenhardt, 2009). There is also recognition of a *bona fide* marijuana withdrawal syndrome (with symptoms that include irritability, sleeping difficulties, dysphoria, craving, and anxiety), which makes cessation difficult and contributes to relapse (Budney & Hughes, 2006; Gorelick et al., 2012). Furthermore, problematic use and addiction have been studied as risk factors and consequences of mental illness, thus making it necessary to perform a careful literature review in order to analyze this association.

**Marijuana and Mental Illness**

In relation to mental illness, Patton, Degenhardt, Lynskey, Hall, and Wayne (2002) reported that regular marijuana use is associated with an increased risk of anxiety and depression although causality has not been established. Marijuana is also linked with psychoses (including those associated with schizophrenia), especially among people with a pre-existing genetic vulnerability (Meier et al., 2012; Volkow et al., 2014), and exacerbates the course of illness in patients with schizophrenia. Heavier marijuana use, greater drug potency, and exposure at a younger age can all negatively affect the disease trajectory (e.g., by advancing the time of a first psychotic episode by two to six years, (Di Forti et al., 2013). However, it is inherently difficult to establish causality in these types of studies because factors other than marijuana use may be directly associated with the risk of mental illness. In addition, other factors could predispose a person to both marijuana use and mental illness. This makes it difficult to attribute confidently the increased risk of mental illness to marijuana use (Volkow et al., 2014).

Volkow et al. (2014) further explained the effect of marijuana use on brain development. Compared to unexposed controls, adults who smoked marijuana regularly
during adolescence had impaired neural connectivity in specific brain regions which are involved in functions that require a high degree of integration (e.g., alertness and self-conscious awareness), and in learning and memory (Volkow et al., 2014; Zalesky et al., 2012). Filbey and Yezhuvath (2013) also reported that reduced functional connectivity has been associated with prefrontal networks responsible for executive function (including inhibitory control) and the subcortical networks which process habits and routines. In addition, imaging studies in persons who use marijuana have revealed decreased activity in prefrontal regions and reduced volumes in the hippocampus (Batalla et al., 2013). In addition, the negative effect of marijuana use on the functional connectivity of the brain is particularly prominent if use starts in adolescence or young adulthood (Zalesky et al., 2012), which may help to explain the finding of an association between frequent use of marijuana from adolescence to adulthood and the significant decline in Intelligence Quotient (IQ) scores (Meier et al., 2012). The impairments in brain connectivity associated with exposure to marijuana in adolescence are consistent with preclinical findings, indicating that the cannabinoid system plays a prominent role in synapse formation during brain development (Gaffuri, Ladarre, & Lenkei, 2012; Volkow et al., 2014).

Therefore, the relationship between marijuana use by adolescents and psychosocial harm is likely to be multifaceted, which may explain the inconsistencies found among studies. For instance, one study suggests that long-term deficits may be reversible and remain subtle rather than disabling once a person abstains from use (Macleod et al., 2004). Other studies show that long-term and heavy use of marijuana result in impairments in memory and attention that persist and worsen with increasing years of regular use (Solowij et al., 2011), and with the initiation of use during adolescence (Schweinsburg, Tapert, & Brown, 2008; Volkow et al., 2014).
Physical harms of marijuana use

Marijuana intake has also been implicated as risk factors for the development of physical illness. Volkow et al. (2014) observed that the effects of long-term marijuana smoking on the risk of lung cancer are unclear. In this scenario, the use of marijuana for the equivalent of 30 or more consecutive years (with one joint-year of marijuana use equal to one cigarette [concomitant use] of marijuana smoked per day for one year) was associated with an increased incidence of lung cancer and several cancers of the upper aero-digestive tract. However, the association disappeared after adjustment for potential confounders such as cigarette smoking (Hashibe et al., 2006). Although the possibility of a positive association between marijuana smoking and cancer cannot be ruled out (Callaghan, Allebeck, & Sidorchuk, 2013), the evidence suggests that the risk is lower with marijuana than with tobacco (Hashibe et al., 2006). Nevertheless, the smoking of cigarettes that contains both marijuana and tobacco products is a potential confounding factor with a prevalence that varies dramatically among countries (Volkow et al., 2014).

In physical health, Gordon, Conley, and Gordon (2013) described the relationship between consumption of marijuana and increased risk of infection associated with the alteration of cellular immune response. They also suggest that there may be a likely association with the occurrence of respiratory and cardiovascular problems with marijuana use.

Marijuana smoking is also associated with inflammation of the large airways, increased airway resistance, and lung hyperinflation, associations that are consistent with the fact that regular marijuana smokers are more likely to report symptoms of chronic bronchitis than are non-smokers (Tashkin, 2013; Volkow et al., 2014). Nonetheless, the long-term effect of low levels of marijuana exposure does not appear to be significant (Pletcher et al., 2012). The immunologic competence of the respiratory
system in marijuana smokers may also be compromised, as indicated by increased rates of respiratory infections and pneumonia (Owen, Sutter, & Albertson, 2014). Marijuana use has also been associated with vascular conditions that increase the risks of myocardial infarction, stroke, and transient ischemic attacks during marijuana intoxication (Thomas, Kloner, & Rezkalla, 2014). The actual mechanisms underlying the effects of marijuana on the cardiovascular and cerebrovascular systems are complex and not fully understood (Volkow et al., 2014).

**Medical benefits of marijuana use**

Marijuana use has been associated with some benefits. Some studies have been conducted on medical marijuana use and the results must be carefully considered. Marijuana for medical purposes has been used for a wide spectrum of symptoms and illnesses. The analysis of the positive effects of marijuana use is relevant in the context of debates regarding the establishment of new regulations to legalize medical and recreational uses.

**Marijuana use in chronic pain.** Marijuana has been used to relieve pain for centuries (Volkow et al., 2014). Studies have shown that cannabinoids acting through central and peripheral receptors play an important role in modeling nociceptive responses in various models of pain. These findings are consistent with reports that marijuana may be effective in ameliorating neuropathic pain (Chiou, Hu, & Ho, 2014; Wallace et al., 2007; Wilsey et al., 2008).

**Marijuana use in nausea.** Treatment of nausea and vomiting associated with chemotherapy was one of the first medical uses of Tetra-Hydro-Cannabinol (THC) and other cannabinoids (Zuardi, 2008). THC is an effective antiemetic agent in patients undergoing chemotherapy (Sallan, Zinberg, & Frei, 1975), but patients often state that
marijuana is more effective in suppressing nausea. Paradoxically, increased vomiting (hyperemesis) has been reported with repeated marijuana use (Volkow et al., 2014).

Cannabinoids have been reported to have substantial anti-inflammatory effects because of their ability to induce apoptosis\(^1\), inhibit cell proliferation, and suppress cytokine production (Nagarkatti, Pandey, Rieder, Hegde, & Nagarkatti, 2009; Volkow et al., 2014). Cannabidiol has attracted particular interest as an anti-inflammatory agent because of its lack of psychoactive effects (Zuardi, 2008). Animal models have shown that cannabidiol is a promising candidate for the treatment of rheumatoid arthritis and for inflammatory diseases of the gastrointestinal tract (i.e., ulcerative colitis and Crohn's disease (Esposito et al., 2013; Zuardi, 2008).

**Marijuana use in Epilepsy.** Porter and Jacobson (2014) reported that in a recent small survey about parents who use marijuana with a high cannabidiol content to treat epileptic seizures in their children, 11% (two families out of the 19 that met the inclusion criteria) reported complete freedom from seizures, 42% (eight families) reported a reduction of more than 80% in seizure frequency, and 32% (six families) mentioned a reduction of 25 to 60% in seizure frequency. Although such reports are promising, insufficient safety and efficacy data are available on the use of marijuana botanicals for the treatment of epilepsy (Kogan & Mechoulam, 2007). However, there is increasing evidence on the role of cannabidiol as an antiepileptic agent in animal models (Hill et al., 2013).

**Marijuana use in individuals with AIDS.** Reports have indicated that smoked or ingested marijuana improve appetite and lead to weight gain, as well as improve mood and quality of life among patients with AIDS (D’Souza et al., 2012).

\(^1\)Apoptosis, or programmed cell death, is a naturally occurring biochemical process in the body.
Nevertheless, there is no long-term or rigorous evidence of a sustained effect of marijuana on AIDS-related morbidity and mortality, with an acceptable safety profile, that would justify its incorporation into current clinical practices for patients who are receiving effective antiretroviral therapy (Lutge, Gray, & Siegfried, 2013). In brief, there is an important amount of information about medical marijuana use and associated benefits, although they are not conclusive. This must be considered carefully, taking into account potential benefits and harms before implementing a less restricted policy.

**Effects of marijuana use on adolescents**

Beyond the discussion about the benefits and/or harms of marijuana use and the implications of legalization or decriminalization policies among different countries, the effects of marijuana use at early ages in the lifespan have been studied by many researchers. They consider the possible impacts on physical, psychological and social health during adolescence and in adulthood.

**Effects on physical and psychological health.** Studies have been conducted to determine the effects of consumption of marijuana in adolescents. Dougherty et al. (2013) show that marijuana use is associated with loss of short-term memory. This remains even after abstinence for six weeks and occurs in a shorter time of use in the adult period. The same study indicates that there is a greater tendency for impulsivity in adolescents who use marijuana, which may in the medium term have an impact on the development of problematic use. The same effect on memory was found in a review developed by Crane, Schuster, Fusar-Poli, and Gonzalez (2013), which affirmed that this occurs in both casual and frequent users.

This review notes that other neuro-cognitive effects are not as consistent in their association with marijuana and states that the ability to make decisions and take risks
remain intact during episodes of acute poisoning, but it is altered in regular consumption, and may have some effect on the development of problem use. In addition, making the decision to quit using marijuana is harder, even when the risks are known (Crane et al., 2013). Impaired memory and verbal learning were found by Solowij et al. (2011) in adolescents with a consumption time average of 2.4 years of use. In the same vein, Meier et al. (2012) showed that persistent use of marijuana was associated with neuropsychological decline, especially executive functioning and processing speed. This study observed that IQ score declined in adulthood when the age of initiation of use is adolescence, while when the consumptions start as adults, this IQ decline did not occur. Finally, with marijuana cessation, former persistent functioning in the brain is not fully restored.

The effects of marijuana in the adolescent’s brain have been studied by many researchers and cortical changes have been widely described. James, James, and Thwaites (2013) found cortical changes in normal adolescents, associating them with effects in primary reinforcers\(^2\) like taste and touch, persisting after six month of abstinence. In their review, they observed that when cognitive demands are low, both marijuana users and the control group function well, but when demands are higher, function declines for marijuana users and there is loss of inhibition. In another study, Jacobus et al. (2012) reported changes in cerebral blood flow, with decreased perfusion, that could be critical for brain development in late adolescence.

In other aspects, Ditmyer et al. (2013) suggested that there is an association between oral health and marijuana and tobacco use, a risk factor for severe cavities in adolescence. One study described the impact of marijuana smoke over the cardiovascular system, demonstrating that heart rate variability increased significantly

\(^2\) A reinforcement refers to anything that increases the likelihood that a response will occur. Primary reinforcers are biological such as food, drink, and pleasure.
in young male users. In sum, marijuana does not only affect the brain, but also other systems are affected by marijuana use that can be relevant in adolescent development (Schmid, Schönlebe, Drexler, & Mueck-Weymann, 2010).

**Social and other effects.** Marijuana use has an effect on peers, as an important risk factor. Ali, Amialchuk, and Dwyer (2011) determined that increasing the proportion of closest friends and classmates marijuana consumers, the consumption increased by five percentage points, identifying a strong relationship between adolescent behaviour and peers behaviour.

Asbridge, Hayden, and Cartwright (2012) found an association between acute marijuana use and the occurrence of accidents, especially those with fatal results. However, Arterberry et al. (2013) found in a sample of 597 adolescents users that 35.4% reported driving after smoking marijuana, with no expectancies of less control or impaired driving. Other related studies remark that driving under the effects of marijuana is more common among frequent users (Bergeron, Langlois, & Cheang, 2014; Fischer et al., 2014). Brady and Li (2014) show that the most common non-alcohol substance detected in car accidents with fatal results was marijuana, contributing to an increase the mortality in individuals under 25 years of age. Considering the impact of other related substance use, such as alcohol, some findings over brain development in adolescent users related to impulsivity and risk-taking behaviour suggest an increase in car accidents with the additional effect of marijuana use (Brady & Li, 2014).

Thus marijuana use in adolescence has several effects on different aspects of life. These effects have both short-term and long-term impacts, and could affect the development and life in adulthood.
Marijuana laws in the Caribbean and Latin America

Regulatory policies on marijuana use have been discussed for years on the framework of illicit drugs. In this analysis, different aspects must be considered, such as economic issues (trade), moral assumptions (users need to be reformed and/or punished), health consequences and justice (Velleman, 2013).

The international drug control system is based upon three main conventions emanated within the United Nations' system: the 1961 Single Convention on Narcotic Drugs; the 1971 Convention on Psychotropic Substances; and the 1988 Convention against Illicit Traffic in Narcotic Drugs and Psychotropic Substances. The nine participant countries in this study are bound by them, by accession or ratification, and it is mandatory for these countries to adopt the guidelines and to establish penalties for activities involving illicit drugs. In all three conventions, marijuana is presented as a highly addictive and a 'liable to abuse' substance, with particularly dangerous properties, which must be prohibited (United Nations, 1961, 1971, 1988).

Nevertheless, even when bound by the UN conventions, the decisions of two states in the USA (Colorado and Washington; though still an illegal substance according to federal laws) and Uruguay to legalize the consumption and production of marijuana for personal use raise new scenarios and open the discussion to topics not related exclusively with marijuana as an addictive substance (Room, 2014).

In this global scenario, some statements such as 'most illicit drugs are less harmful than either alcohol and tobacco', 'prohibition turns large number of citizen into criminals' are very common in the regulatory changes debate (Velleman, 2013). The influence of prohibition on drug prices, the impact on organized crime, the violence and corruption associated with drug issues, and the demonstration that the 'war on drugs'
failed, must be considered before changing local regulations or establishing new international conventions.

In this context, the concepts of legalization de-penalization or decriminalization of marijuana became a buzzword, creating heated and lively debates. The results of some of these debates may have been thought impossible in the past, however legalization, de-penalization or decriminalization have already become a reality for some countries in the hemisphere (Joffe & Yancy, 2004).

Legalization, de-penalization and decriminalization are often used interchangeably; however they do not refer to the same concept, according to The Drug Problem in the Americas: Legal and Regulatory Alternatives:

“Decriminalization includes non-criminal penalties such as fines, or interventions designed to dissuade users from continuing to consume illicit drugs. The term depenalization is now widely used in discussion of alternative legal regimes. This refers to a reduction from current levels in the formal penalties of any kind for possession of a drug for personal use. While Legalization refers to a regime in which both production and consumption are legal. There may be legal restrictions on both sides of the market, even with criminal penalties for violations. Legalization means that it is possible for a large class of individuals to obtain the drug without penalty and for the drug to be produced and distributed without penalty by some entities”. (OAS, 2013, p. 8).

The extent (and context) to which marijuana is legalized, de-penalized or decriminalized is highlighted for relevant countries in Latin America and the Caribbean. This exploration is centered on the following countries: Jamaica, St. Kitts & Nevis, Dominican Republic, Trinidad & Tobago, Colombia, Brazil, Chile, Belize and Mexico.
However, other countries in the hemisphere and the world that are noteworthy are also mentioned in this review.

The countries previously listed are at different stages in regulatory changes. In most of them, the recreational and medicinal use, sale and production of marijuana are prohibited. For some, change in the regulatory process is at an infant stage while others have already explored and passed de-penalization or decriminalization laws. However, no country in the list has legalized marijuana (OAS, 2013).

Table 1.

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<tr>
<th>Country</th>
<th>Regulation on Marijuana</th>
<th>Notes</th>
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<tr>
<td>Belize</td>
<td>Illegal</td>
<td>Personal, medicinal, production and sale are all illegal. Discussions are now being held regarding decriminalization.</td>
</tr>
<tr>
<td>Brazil</td>
<td>De-penalized</td>
<td>For unauthorized possession individuals will have to complete a safety measure such as drug abuse education or community service. Sale and production are illegal.</td>
</tr>
<tr>
<td>Chile</td>
<td>Decriminalized</td>
<td>Consumption or possession in public places is sanctioned. A judge decides minimum quantity for possession.</td>
</tr>
<tr>
<td>Colombia</td>
<td>Decriminalized</td>
<td>No more than 20 grams for personal use.</td>
</tr>
<tr>
<td>Dominican Republic</td>
<td>Illegal</td>
<td>Some discussion towards decriminalization.</td>
</tr>
<tr>
<td>Jamaica</td>
<td>Illegal</td>
<td>Possession for personal use is usually sanctioned with a fine or rehabilitation. Discussions are intense and ongoing for legalization and/ decriminalization.</td>
</tr>
<tr>
<td>Mexico</td>
<td>Decriminalized</td>
<td>When quantities do not exceed 5 grams sanctions are not applied.</td>
</tr>
<tr>
<td>St. Kitts &amp; Nevis</td>
<td>Illegal</td>
<td>Current ongoing discussion on decriminalization.</td>
</tr>
<tr>
<td>Trinidad &amp; Tobago</td>
<td>Illegal</td>
<td>Current ongoing discussion on decriminalization.</td>
</tr>
</tbody>
</table>

Note. Adapted from OAS (2013)
The legalization and/or decriminalization of marijuana has implications that are difficult to predict. The Organization of Americas States (2013) asserts that “legalization of controlled substances, especially if commercialized, could complicate prevention efforts, decrease prices, and thus expand use and addiction, with all the negative consequences that accompany these trends. (p. 5).” However, the organization also emphasizes that social issues such as crime and violence might decrease. Essentially, countries will only discover this impact after some time of monitoring, evaluation and assessment of these regulatory changes.

**Perception of harm of marijuana use among adolescents**

Regulatory changes on marijuana use in several countries have proved to be an ongoing struggle for global health policies, with the possibility of having a considerable impact on the adolescent’s perception of harm regarding the use of marijuana. The 2014 World Drug Report stressed that based on existing research; it can be argued that with a declining risk perception and increased availability, adolescent initiation use may increase. They affirmed that for adolescents and young adults, more permissive marijuana regulations correlate with the decrease in the perceived risk of use, and lowered risk perception has been found to predict increase in use. The report also warned that although the general public may perceive marijuana to be the least harmful illicit drug, between 2003 and 2012, the proportion of total treatment admissions for marijuana increased in several countries (UNODC, 2014).

The report stated that onset of marijuana use among adolescents is of particular concern due to the increased risk of harm. Some of these include: the use of other drugs and dependent drug use, a risk of heavy dependence, lung problems, memory impairment, psychosocial development problems and mental health problems, and
poorer cognitive performance associated with early initiation and persistent use between the early teenage years and adulthood (UNODC, 2014).

According to the survey “Monitoring the Future” (Johnston et al., 2014) perception of the risks associated with marijuana use have shifted so that fewer adolescents believe that drugs are harmful. The authors noted that such a change often predicts increased future use of a drug. The survey found that only 41.7% of eighth graders see occasional marijuana use as harmful, while 66.9% see regular use as harmful. Furthermore, the authors stated that this was the lowest level documented in this age group since 1991, when the study began tracking risk perception among eighth graders. Of particular importance, perceived risk associated with marijuana use continued to decline sharply in all three grades. Disapproval also declined somewhat in 2013. These changes often presage increases in marijuana prevalence in the future. Perceived availability remained relatively stable. Marijuana use in 12th grade was higher than smoking cigarettes (21.4% versus 19.2% past month).

Kilmer, Hunt, Lee, and Neighbors (2007) found that risk perception was greater among nonusers of marijuana than for those who reported marijuana use (and, in turn, who were more likely to have actually experienced a drug-related consequence). Among marijuana users, risk perception was not influenced by the frequency of marijuana use nor was it influenced by the actual experience of a drug-related consequence. For abstainers, perceived risk and the potential consequences of marijuana use may serve a protective role against the initiation of marijuana use. For those who use marijuana, intervention efforts utilizing motivation enhancement approaches could explore the discrepancy between perceived risks and actual experienced consequences.

An Australian household survey on perceived health risks of marijuana use showed that respondents believed that marijuana use can cause health and social
problems, can adversely affect a person’s ability to drive a car, can be addictive, and can lead to the use of other illicit drugs (Calabria, Swift, Slade, Hall, & Copeland, 2012). Respondents were uncertain as to whether marijuana can cause schizophrenia and depression, and whether marijuana had become more potent over time. In the same context, the results of a study conducted in Bogota and Barcelona with 865 school students (15 to 18 year-olds) showed that fear of the consequences or the perception of a risk of illness or injury and conditions favouring use do not seem to have an obvious influence on the various use habits among older adolescents (Trujillo et al., 2007).

Thornton, Baker, Johnson and Lewin (2013) found that for tobacco and marijuana, substance use was inversely and significantly related to perceived harm. They concluded that higher risk perceptions for tobacco and marijuana were associated with being female and perceived effectiveness of anti-substance use campaigns. They also noted that people with mental health disorders perceived marijuana to be more harmful than people without any disorder.

A survey on the use of the bio-ecological model to predict risk perception of marijuana use in adolescence found that adolescents tend to perceive themselves as being invulnerable to harm and make decisions about health risk behaviour based on this perception (Fleary, Heffer, McKyer, & Newman, 2010). However, insufficient research has focused on why some adolescents engage in health risk behaviour despite having similar risk perception to those who refrain from the behaviour.

Several models or theories have been developed to explain the use of drugs in different populations, including the Health Belief Model, which assumes that risk perception is related negatively to health risk behaviour, but it fails to incorporate bio-ecological variables that are crucial in adolescents’ decision making. Another theory is the Framework for Drug Use or Domain Model purported by Huba, Wingard, and
Bentler (1980), which incorporates biological, intrapersonal, interpersonal and sociocultural domains to explain drug use among adolescents.
Theoretical Framework

From the systemic approach, substance use is a socially complex phenomenon. It can only be meaningfully understood by analyzing the complex relations of the users, rather than a linear causal deterministic perspective. The systemic approach brings a broader reading of the factors involved in substance use behaviour, which includes: the physical effects of the drug, the user beliefs on the power of the drug, the quality of the emotional bonds the user has with his family and friends, the network of favours that consumption imposes, mainly in relation to funders and suppliers. Without considering these aspects, the understanding of the meaning of the drug addiction is incomplete (Colle, 2001).

Several theories and frameworks have been developed in order to describe or predict drug use among adolescents. For many years, policy makers, health professionals and researchers have tried to understand the causes that lead adolescents to start drug use. However, the phenomenon is multivariate and some theories focus on one or another aspect of the problem, without answering the core question about the phenomenon.

Some theories are focused on cognitive-affective aspects, which assume that beliefs about consequences are a primary cause of drug use among adolescents. However, it is difficult to say whether beliefs or the experience of experimental drug use precipitates the behaviour. Other theories are focused on social-learning processes and work with the assumption that behaviours and beliefs are socially learned. Some theories focus on attachment or commitment as a primary factor for the development of a drug use problem. Finally, there are theories which create a simultaneous integration of several areas, and assume that drug use is a complex phenomenon (Petraitis, Flay, & Miller, 1995).
Considering the complexity of the phenomenon of drug use in adolescence and the influence of multiple factors, the intention to use could be affected by perceptions of harms or benefits that adolescents have, within the context of a socio-cultural and interpersonal influence.

Among the available theories, the Framework for Drug Use or Domain Model (Huba et al., 1980) aims to explore the influence and interaction of different domains: Biological, Intrapersonal, Interpersonal and Socio-cultural, on the behaviour of adolescents. This model can be useful to better comprehend the effect of adolescents’ perception of harms or benefits of using marijuana in relation to their intention to use it.

**The Domain Model**

The Domain Model was developed by Huba et al., (1980) to provide a theoretical framework in which they catalogue many (if not most) of the correlates to drug use established by scientific studies and explicate their relationship to each other. Their approach consists of an interactive model in which biological, intrapersonal, interpersonal, and sociocultural domains jointly influence adolescent’s substance use behaviour (see Figure 1). The model includes over 50 possible causes of substance use, which are catalogued into 13 clusters of varying proximity to experimental substance use. These 13 clusters are then grouped into four general domains (Petraitis et al., 1995).

The biological domain consists of genetic susceptibility to addictive effects of substances, an individual’s physiological reactions to substance use, and general health.

The intrapersonal domain that influences the decision to use includes psychological status, expectations regarding consequences of substance use, cognitive style, personality traits and affective states (sensation seeking, impulsiveness,
sociability, extraversion, neuroticism, depression, anxiety, and low self-esteem), and personal values (such as success, achievement, independence).

Interpersonal characteristics, including social support, modeling, social reinforcement, and sense of identity and belonging contribute to substance involvement. This domain highlights factors such as the makeup and availability of one’s social network, including the attitudes and characteristics that the individuals perceive their social network as espousing. In other words, the third domain represents interpersonal influences and encompasses the characteristics of those people who provide social support for adolescents and with whom adolescents are emotionally attached.

Finally, the sociocultural domain comprises media images of alcohol and other drugs, the market availability of substances, and prevalent social sanctions against substance use, such as criminal penalties, and laws regarding substance use, social expectations, and environmental stressors that operate at a sociocultural level and impact the development of adolescents' substance use. This last domain highlights important factors to understand substance abuse vulnerability that is usually overlooked in most theories (Szalay, Strohl, & Doherty, 1999; Wolfe & Mash, 2006).
In 2012, Pagliaro and Pagliaro postulated a Meta-interactive Model of Child and Adolescent Use of Drugs and Substances of Abuse, which is a multivariate theory specifically developed to facilitate a better understanding of the many interacting variables that have been related to, or have been identified as influencing the use of drugs and substance of abuse by children and adolescents (see Figure 2). Comprised of four major variable dimensions, particular attention is given to the child or adolescent dimension and its interaction with the other three dimensions – the drug or substance of abuse dimension, societal dimension, and time dimension – in order that these interactions can be more fully and properly understood in an actual clinical context. Notwithstanding the authors named it differently, the meta-interactive model is essentially identical to the Domain Model.
In this model, the factors considered in each child or adolescent dimension are:

1) **Biological Influences**: age, continental descent, gender, genetic predisposition to mental disorders and substance use disorders, physical impairment or disability.

2) **Intrapersonal Influences**: antisocial personality disorder, attention-deficit/hyperactivity disorder, conduct disorder, gender identity crisis, major depressive disorder, other active mental disorder, external locus of control, hopelessness, lack of meaning in life, loneliness, low self-esteem, previous use of the drugs and substance of abuse, serious early childhood losses.

3) **Interpersonal Influences**: absence of maternal figure or role model, absence of paternal figure or role model, dissatisfaction with family relationships, parent or sibling use of alcohol or other drugs and substances of abuse, parental neglect,
peer pressure, physical or sexual abuse, previous inpatient treatment for mental disorders, use of drugs and substances of abuse by close friends or peers.

4) **Societal dimension:** availability and accessibility of social programs and services (treatment), culture, ethnicity, or continent descent, laws of the land (such as the status and sanctions for possession, use, or trafficking), media messages.

5) **Drug or Substance of use dimension:** availability of the drugs and substances of abuse cost of use, pattern of use.

**Operative framework**

The key component of the Domain Model that makes it adequate for this study is that it explains substance use as a complex system with different interrelated parts (Petraitis et al., 1995). The researchers recognize that the perception of harms and benefits of marijuana and its relation to intention to use among adolescents contain different influential aspects. To this study, the most applicable domains from the theory include the intrapersonal, interpersonal and socio-cultural categories. Specifically, the researchers focus on perception and consciousness under the intrapersonal domain; intimate social support system under the interpersonal domain; and social sanctions, socioeconomic resources and product availability under the socio-cultural domain.

Although the study focuses on specific influential variables, the researchers recognize that the intention to use marijuana is influenced by many other factors. Some of these factors include a history of trauma, parenting style, parents’ or siblings’ use of drugs, anti-social behaviour, genetics, organismic status, among others (Pagliaro & Pagliaro, 2012).
The Figure 3 outlines the influential variables in the perception and intention to use drugs among adolescents.

**Figure 3.** Diagram of the operative framework.

Although the original model highlights causal variables in relation to drug use, this study is exploring relationships/influences on marijuana use. Therefore the study examines the following factors as influencing adolescents’ intention to use marijuana.

1) **Interpersonal factors:** There are several interpersonal factors that can influence adolescents’ use of marijuana. This dimension is one of the most pertinent to this particular population because adolescence is a period of lifespan when peer-relationships become very influential and important. One of the most important factors in this domain is peer influence. Several researchers found that when adolescents have friends who use drugs they are more likely to use themselves (Ali et al., 2011; Coronges, Stacy, & Valente, 2011; Pagliaro & Pagliaro, 2011).

Hyshka (2013) highlighted that the peer network of adolescents may be a strong risk factor for both the initiation (from ages 11-15) and progression to regular use. However it is difficult to assess whether marijuana use is the risk factor or simply an outcome for the selection of peers who use. The study further
percepts that the structure and quality of the family are especially important as it relates to adolescents' use of drugs. Some of the key factors have also been linked to early substance use in adolescents, such as: lack of parental monitoring, family conflict and poor bonding.

2) Intrapersonal factors: Perception of harms and benefits of marijuana use is the crux of the study because it is the basis on which the study will explore any relationship to the adolescents’ intention to use. This dimension is related to the previous one because peers and family relationships can influence perception. Also, the perceived risk of harms can influence the substance use (Andersson et al., 2009; Calabria et al., 2012; Fleary et al., 2010; Kilmer et al., 2007; Kuehn, 2013; Lopez-Quintero & Neumark, 2010; Menghrajani, Klaue, Dubois-Arber, & Michaud, 2005; Thornton et al., 2013; Trujillo et al., 2007). This further illustrates the complex interrelated phenomenon of drug use.

3) Sociocultural factors: Individuals and groups exist within a historical, economical and social milieu. People's attitudes and behaviours are influenced by the values and structure of their society. Thus, changes in cultural norms, legal assumptions, and economic tendencies will inevitably influence substance use behaviours. At the macro level, the influence of socioeconomic disadvantages, such as poverty, has been associated with an increased risk of adolescents' conduct problems and delinquency. There also appears to be a negative relationship between socioeconomic status and crime. It is noteworthy that a similar relationship has not been found between adolescent use and socioeconomic status.

An association has been found when extreme poverty is accompanied by childhood behaviour problems. The combination can lead to increased risk for
later alcoholism and drug problems (Hawkins et al., 1992). Factors like social sanctions and laws regarding substance use will be examined in the study, although the age group being studied falls below the legal age for consideration in any regulatory changes. The study uses hypothetical questions to highlight the relationship between intention to use if the adolescent were older and had access to marijuana. However, it is important to note that research has shown that sanctions and laws regulating drug use do not cause a decrease in consumption (Cerda, Wall, Keyes, Galea, & Hasin, 2012; Choo et al., 2014; Joffé & Yancy, 2004; Lynne-Landsman, Livingston, & Wagenaar, 2013; Room, 2014).

The model also highlights product availability and socioeconomic resources. One factor that may be generally influential is price (or changes in price) of the drug. This is of particular importance because the onset of drug use tends to be in the period of adolescence. One study found that a ten percent reduction in the price of marijuana would lead to a three percent increase in the number of high school seniors for both past year and past month use. The study also found that the legal risk may affect initiation of use but has little effect on adolescents who are already using (Pacula & Lundberg, 2014).

Among all the factors influencing use and intention to use marijuana by adolescents, this study focuses on those related to perception of harms and benefits and peer influence in the hypothetical context of a change in regulation.
Definition of Terms

Adolescence. The stage between 10 to 19 years, although it is not strictly established when the individual completes the maturation process that defines adulthood. Adolescence is a stage of life characterized by transitions, when physical, psychological and social changes occur, in order to develop the identity, autonomy and maturity that characterize an adult (WHO, 2014).

Marijuana. One of the street names for the Cannabis sativa plant. The main Psychotropic ingredient is tetrahydrocannabinol. It is used in three forms: herbal cannabis is the dried leaves and flowering tops, also known as “cannabis”, “ganja”, or “weed”, among others; “hashish” or “charash” is the dried, compressed resin of cannabis; and cannabis oil, a mixture resulting from distillation or extraction of active ingredients of the plant. Herbal cannabis is the cannabis product used most frequently in much of the world, while cannabis resin is primarily used in Europe (UNODC, 2013).

Perception. Refers to the interpretation, view, appraisal, belief, judgment, opinion or way of thinking that a person gives to something, through their senses.

Risk. The likelihood of developing a negative outcome. It is not equivalent to causality (Sloboda, Glantz, & Tarter, 2012).

Perception of risk/Perception of harm. The beliefs an individual has about the likelihood of developing a negative social or health outcome, as a consequence of a specific behavior (Curry & Youngblade, 2006).

Perception of benefits. The beliefs about the positive outcomes associated with behaviour. The perceived benefit construct is most often applied to health behaviours and is specific to an individual's perception of the benefits that will accrue by engaging in a specific health action (Champion, 2008).
The intention to use. Intentions have been defined in the Theory of Reasoned Action/Theory of Planned Behaviour as the amount of effort one is willing to exert to attain a goal, behavioural plans that enable attainment of a behavioural goal, or simply “proximal goals”. In essence, intentions can be conceived of as goal states in the expectancy value tradition that are the result of a conscious process that takes time, requires some deliberation, and focuses on consequences (Champion, 2008). In this specific study, the goal is to use marijuana.
**Research Question**

What are the perceived harms and benefits of marijuana, and their associations with marijuana use among secondary school students aged 15-17, and students’ intention to use in the context of regulatory changes?

**Research Objectives**

**General objective**

To explore the perceived harms and benefits of marijuana and its association with marijuana use among secondary school students aged 15-17, as well as their intention to use within the context of regulatory changes.

**Specific objectives**

- To evaluate the perception of harm from using marijuana in adolescents.
- To evaluate the perception of benefits from using marijuana in adolescents.
- To determine life-time, past year and past month prevalence of marijuana use.
- To explore the relationship between marijuana use and the perception of harm and benefits from using marijuana.
- To explore the association between the perception of harm/benefits, demographic variables and intention to use in the context of regulatory changes.
Hypotheses

**Null hypotheses**

A low perception of harm of marijuana is not associated with marijuana use among secondary school students aged 15-17.

A high perception of benefits of marijuana is not associated with marijuana use among adolescents among secondary school students aged 15-17.

A low perception of harm of marijuana is not associated with the intention to use marijuana among secondary school students aged 15-17.

A high perception of benefits of marijuana is not associated with the intention to use marijuana among secondary school students aged 15-17.

**Research hypotheses**

A low perception of harm of marijuana is associated with marijuana use among secondary school students aged 15-17.

A high perception of benefits of marijuana is associated with marijuana use among adolescents among secondary school students aged 15-17.

A low perception of harm of marijuana is associated with the intention to use marijuana among secondary school students aged 15-17.

A high perception of benefits of marijuana is associated with the intention to use marijuana among secondary school students aged 15-17.
Methodology

Research Design

This study is a multi-centric, quantitative cross-sectional survey that will be conducted in Belize, Brazil, Chile, Colombia, Dominican Republic, Jamaica, Mexico, St Kitts and Nevis, and Trinidad and Tobago.

Participants and Sample size

The participants for this study will comprise 2680 public secondary school students, between the ages of 15-17 years, from 10 cities within the nine countries listed above.

Sample size. The sample size was calculated considering the purpose of the study, which is to evaluate the perceived harms and benefits associated with marijuana use, among adolescent students aged 15-17 in public secondary schools.

Usually, national censuses and reports from ministries of education report age distributions in five-year ranges. The population of interest for this study is included in the 15-19 year age group, making it difficult to determine the size of this population. Therefore, the sample size was estimated for each city using the following procedure.

The proportions and the distribution of the population are unknown, therefore, a ratio of 50% \( (P = 0.5) \) is assumed with an accuracy of 6% \( (d = 0.06) \), where:

a) \( P \): Expected proportion in the population, \( P=0.50 \)

b) \( 100(1-\alpha)\% \): Confidence Level = 95%

c) \( d \): Absolute accuracy required, \( d=0.06 \) (6%)

The following equation is used for this case:

\[
n = \frac{Z_{1-\alpha/2}^2 \times P(1-P)}{d^2} ; \quad n = 268
\]
A sample size of 268 in each city will have a medium effect size at a $\alpha = 0.05$ level (Cohen, 1992).

**Sample selection process.** Owing to differences in class streaming and grade levels across the nine countries, sample selection is based on age rather than grade. Each local PI will collect 268 questionnaires in each of the 10 cities across the nine countries, for a total sample of 2680 students. The students will be selected in three stages: (1) selection of tertiary units, (2) selection of secondary units; and, (3) selection of primary units.

**Tertiary Units.** Secondary School Location. Convenience sampling will be used to select each community (district/village/parish/province) where the survey will be conducted. Each community should be in close proximity to the researcher, so it can be easily accessed, and may be located in either an urban or a rural area.

In cases where the population of student’s ages 15-17 years is less than the required sample of 268, a second community will be selected.

**Secondary Units: School Selection.** Simple random sampling will be used to select the secondary school(s) in which the study will be conducted. This will be done using Microsoft EXCEL via the following procedure: in Column A, create a list of all the secondary schools in the identified Area. Next, in Column C, paste the function =RAND() which will allow for an EXCEL-assigned random number between 0 and 1 in each cell. Next, copy Column C and paste the values in Column B (Copy-Paste Special-Values). Then, sort Columns A and B (the list of secondary schools and the randomly assigned EXCEL number) using the customized random option for the column with the assigned random numbers. Finally, select the first one, or two, secondary schools in this sorted list, depending on the area and the availability of students aged 15-17 in the selected schools. Continue process, to select schools from the list, until the target of 268
is met. Classes associated with the age group 15-17 years will be selected. In cases where two communities were selected, repeat this procedure for second community.

*Primary Units:* Participants, selected by Sex and Age. Local PI’s will try to obtain a list of all students aged 15-17 with their age and sex from the administrators of the selected schools. If no list is available, the PI will use Option 1 below to select the sample. If the list does not include age and sex information on students’ age and sex, the PI will use Option 2.

*Option 1.* Use proportionate stratified random sampling to select the participants.

To do this:

1. Summarize the students’ aged 15-17 by sex and age as illustrated by the examples in Tables 2 and 3.

Table 2.  
*Example of Distribution of all 15 to 17 year olds by sex and age*

<table>
<thead>
<tr>
<th>Sex</th>
<th>Age 15 years</th>
<th>Age 16 years</th>
<th>Age 17 years</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>99</td>
<td>80</td>
<td>68</td>
<td>247</td>
</tr>
<tr>
<td>Female</td>
<td>101</td>
<td>99</td>
<td>92</td>
<td>292</td>
</tr>
<tr>
<td>Total</td>
<td>201</td>
<td>179</td>
<td>160</td>
<td>540</td>
</tr>
</tbody>
</table>

2. Calculate the number of males and females in each age category, in proportion with the population of interest. This will be done by using the following formula:

\[
\frac{\text{Number in cell}}{\text{Grand Total}} \times 268.
\]

For example, by using the cell which corresponds to male and 15 years (that is, the number 99), the calculation to determine the required sample size is:

\[
\frac{99}{540} \times 268 = 49.1 \approx 49 \text{ students}.
\]

Table 3 below shows the results generated from Table 2.
Table 3.

*Example of Distribution of required sample of 15 to 17 year olds by sex and age*

<table>
<thead>
<tr>
<th>Sex</th>
<th>15 years</th>
<th>16 years</th>
<th>17 years</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>49</td>
<td>40</td>
<td>34</td>
<td>123</td>
</tr>
<tr>
<td>Female</td>
<td>50</td>
<td>49</td>
<td>46</td>
<td>145</td>
</tr>
<tr>
<td>Total</td>
<td>99</td>
<td>89</td>
<td>79</td>
<td>268</td>
</tr>
</tbody>
</table>

3. Use simple random sampling to select the required number of students from each of the strata. The same type of EXCEL procedure, used to select the Secondary Units, should be used to select the students to participate in this study.

*Option 2.* Use systematic sampling to select the required number of students for each of the strata.

To do this:

1. Arrange the names in alphabetic order by the students’ last name.

   Determine the interval by which the names will be selected by using the formula:

   \[ k^{th} = \frac{N}{n} \]

   where \( N \) = number of students aged 15-17 in the selected secondary schools and \( n \) = the required sample size (268).

   For example, if the school has 540 aged 15-17 in the school, then \( k = \frac{540}{268} \approx 2 \), so, every second student on the list will be selected.

2. Use simple random sampling to select a student from the first \( k \) students, then select every \( k^{th} \) student until the required sample size is obtained.

Note:

1. Oversampling will be employed to ensure that, after data cleaning, the required strata sizes and overall sample size, are acquired at the end of the survey.

2. In cases where two or more secondary schools were selected, the same sample size is required from each school. For example, where two schools
are selected, 134 students will be selected from each school by using one of
the options above.

Units of Analysis

Inclusion criteria. Any student aged 15-17 years who is enrolled in a public
coeducational secondary school in the selected community, that have the ability to read
and write in the first language of the country without any assistance AND can provide
informed assent and parental consent.

Exclusion criteria: Any student who is unwilling/unable to provide informed
consent or whose parent/guardian is unwilling/unable to give parental consent and/or do
not have the ability to read and write the first language of the country without
assistance.

Independent Variables

Demographics. Sex, age, grade and city.

Perception of harm. The general perception of harm will be assessed by three
items used within the Monitoring The Future (MTF) questionnaire. Perception of
specific harm will be assessed using the Benthin Risk Perception Measure (Benthin,
Slovic, Severson, 1993).

Perception of benefits. This variable will be assessed using two items from the
Benthin Risk Perception Measure (Benthin et al., 1993). Two items for evaluating
health and emotional benefits were developed and included by the researchers.

Other variables. Age of onset of marijuana use, use of marijuana by friends.

Dependent Variables

Two dependent variables will be explored, both related to marijuana use.

Marijuana use. Lifetime, past 12 months, and past 30 days prevalence, and
frequency of marijuana use for past 12 months and past 30 days.

Intention to use marijuana. Intention to use marijuana in the hypothetical
context of regulatory changes.
Measurement

The instrument that will be used to collect data is an amalgamation of scales from three instruments, namely: (a) Inter-American Drug Use Data System (SIDUC) Secondary Students School Survey; (b) Monitoring The Future (MTF); and, (c) the Benthin Risk Perception Measure (Benthin et al., 1993). A description of each scale is given below.

**Inter-American Drug Use Data System Secondary School Student Survey—SIDUC.** The SIDUC is a standardized methodology created for obtaining data, forming explanatory concepts, and supporting responses to address psychoactive substance use across Americas and the Caribbean (Organization of American States, Inter-American Drug Abuse Control Commission and Inter-American Observatory on Drugs, 2011). Ten items from this questionnaire will be used, which will serve as a standardized measure across the nine participating countries: three questions will collect demographic data about sex, age and grade; and seven items will assess marijuana use (lifetime, past-12 months and past 30 days), along with frequency of smoking marijuana and age of onset.

**Monitoring The Future (MTF).** This is an annual survey of the lifestyles and values of youths; designed to explore changes in important values, behaviours, and lifestyle orientations of contemporary American youth (Johnston et al., 2014). The current study will include three of its items that explore a general perception of harm related to experimental and frequent marijuana use, scored using a five-point scale. One item that asks about intentions to use marijuana within the context of regulatory changes and one for medical marijuana were included.

**Benthin Risk Perception Measure (Benthin et al., 1993).** This measure uses a seven-point scale to assess the perceived risks and benefits of various behaviours. It has
been used widely in studies exploring perception of risk, harm and benefits, most of which have reported Cronbach alphas over 0.70 (i.e. Curry & Youngblade, 2006; Hampson, Severson, Burns, Slovic, & Fisher, 2001; Gardner & Steinberg, 2005; Magar et al., 2008). Moreover, a Spanish version of this measure is available, and has been previously used in Latin America (see Trujillo et al., 2007). For this study, a slightly modified version will be used to investigate participants’ perceptions about harm and benefits of smoking marijuana. This modified version will consist of eleven questions: eight items from the original scale and three additional items (see Table 4).

Table 4.

*Items and domains of the modified version of the Benthin Risk perception measure*

<table>
<thead>
<tr>
<th>Domains</th>
<th>Items</th>
</tr>
</thead>
<tbody>
<tr>
<td>Knowledge</td>
<td>In your opinion, to what extent are the potential risks (dangers)</td>
</tr>
<tr>
<td></td>
<td>associated with smoking marijuana known to people your age?</td>
</tr>
<tr>
<td>Fear</td>
<td>In your opinion, to what extent are the potential risks (dangers)</td>
</tr>
<tr>
<td></td>
<td>associated with smoking marijuana frightening for people your</td>
</tr>
<tr>
<td></td>
<td>age?</td>
</tr>
<tr>
<td>Personal Risk</td>
<td>If <strong>you</strong> did smoke marijuana, to what extent do you believe that</td>
</tr>
<tr>
<td>Risk to peers</td>
<td>If a <strong>person</strong> of your age engaged in smoking marijuana, to what</td>
</tr>
<tr>
<td>Peer influence</td>
<td>To what extent are you influenced by your friends to smoke</td>
</tr>
<tr>
<td>Avoidability</td>
<td>In your opinion, to what extent can a person your age avoid</td>
</tr>
<tr>
<td>Benefits vs risks</td>
<td>In your opinion, to what extent are the potential pleasures or other</td>
</tr>
<tr>
<td></td>
<td>other benefits provided by smoking marijuana greater than the</td>
</tr>
<tr>
<td></td>
<td>potential risks associated with it?</td>
</tr>
<tr>
<td>Admiration (social)</td>
<td>In your opinion, to what extent are teenagers who are smoking</td>
</tr>
<tr>
<td></td>
<td>marijuana admired by their friends?</td>
</tr>
<tr>
<td>Emotional / psychological (item added)</td>
<td>In your opinion, to what extent can smoking marijuana help persons in your age group to cope with their emotional difficulties?</td>
</tr>
<tr>
<td>Health (item added)</td>
<td>In your opinion, to what extent can smoking marijuana improve</td>
</tr>
<tr>
<td></td>
<td>physical well-being among persons in your age group?</td>
</tr>
<tr>
<td>Academic performance (item added)</td>
<td>In your opinion, to what extent does smoking marijuana improve academic performance?</td>
</tr>
</tbody>
</table>
As in the original measure, a seven-point scale will be used. When a Likert scale is increased to seven-points the reliability limits and its sensitivity are improved (Allen & Seaman, 2007). Additionally, the scale is more likely to be normally distributed (Leung, 2012). Following the procedure set out by Magar Phillips, and Hosie. (2008), an overall average of risk and benefits will be calculated, such that higher scores reflect greater risk. Additionally, the frequency of each response option will be calculated.

**Data collection and Monitoring**

Request permission from authorities to conduct survey. Using a standardized letter the local PI in each city will request approval for the study from the relevant ethics authorities at the National Drug Council, local department of education and the school board.

**Data Gathering Procedure**

The data gathering procedure will be divided into two phases: pretesting the instrument and administration of the instrument.

**First phase: Pretesting the instrument.** As described above, the instrument to be used to collect the data for this study is an amalgamation of scales from three instruments. The instrument will be translated into two languages (Spanish and Portuguese), so it will be very important to pre-test it in each of the participating cities. Pre-testing will ensure that the translations are accurate and help identify any possible problems before the study is launched.

**Step one.** Each PI will pre-test the instrument in their country with 5–7 secondary school students similar to those required for this study. The secondary school students to participate in the pre-test will be conveniently selected.
Step 2. Problems associated with language and translations will be identified and discussed with the other PI’s so that any necessary adjustments can be made to the instrument. A summary of the PI’s experiences should be included in the monthly monitoring report.

Second phase: Administration of the Instrument. Informed consent and assent will be obtained from all subjects. Participation will be voluntary, and confidentiality will be maintained at all times. After potential participants have been selected, they will be provided with a brief outline of the study’s purpose and significance, the lack of risk involved in participation, and their right to withdraw from the study without penalty. They will also be given a letter for their parents along with a consent form. The classroom teachers will be asked to remind the students to return the signed consent form from their parents. The students will be instructed to return the consent forms to the Principal’s Administrative Assistant. The PI or Research Assistant (RA) will make periodic visits to the school(s) to ensure that reminders are given to the students and to collect the forms received.

To ensure anonymity and confidentiality, the data will be gathered by using a pre-coded and self-administered questionnaire. As such, no one will be able to identify the student who completed the questionnaire.

The questionnaire will be administered using paper and pencil in a classroom/room at the selected school. The room should be arranged in such a way that a student cannot see the responses on another students’ questionnaire. The schools’ administrative officers and/or teachers may be present to assist in the monitoring of the students. However, they will not be required to inform the students on any information that pertains to the survey.
Students with parental consent and assent will be given sufficient notice of the date, time and place for the administration of the questionnaire. They will be asked to have their student ID card so that the PI or RA can ensure that the students with consent are actually the students completely the questionnaire. The teachers may also assist in this regard. The students will all be seated. The PI/RA will then inform the students of the purpose of the study and solicit their participation. Students who are unwilling to participate will be excused. The questionnaire and a pencil will be distributed to the students. The students will be asked to complete the questionnaire. The completed questionnaire will be given to the PI/RA by the student who completed it.

The RA will place the completed questionnaires in large, brown envelopes, label (using a pre-code to identify the school) and seal them. The envelopes will be delivered within 24 to 48 hours to the PI.

**Data Entry and Analysis**

**Data entry.** Data will be entered based on a manual’s codebook and procedure (see Appendix X) and analyzed using SPSS software version 20. The accuracy of the data will be validated by randomly cross-checking at least 20% of questionnaires against the database.

**Data analysis.** Data will be analyzed using descriptive and inferential statistics. Descriptive statistics will primarily be used to describe demographic data and address research questions on prevalence; and inferential analyses will be used to explore relationships. The main descriptive statistical procedures to be used will be frequencies and percentages, and the main inferential statistics will be $\chi^2$ and t-test (see Table 5).

Table 5.
**Description and data analysis**

<table>
<thead>
<tr>
<th>Objectives</th>
<th>Statistics</th>
</tr>
</thead>
<tbody>
<tr>
<td>To evaluate the perception of harm from using marijuana in adolescents.</td>
<td>Descriptive statistics:</td>
</tr>
<tr>
<td></td>
<td>o Frequencies</td>
</tr>
<tr>
<td></td>
<td>o Percentages</td>
</tr>
<tr>
<td></td>
<td>o Central tendency measures</td>
</tr>
<tr>
<td></td>
<td>o Crosstabs (by demographic factors and other variables such as sex, age, friends use)</td>
</tr>
<tr>
<td>To examine the perception of benefits from using marijuana in adolescents.</td>
<td>Descriptive statistics:</td>
</tr>
<tr>
<td></td>
<td>o Frequencies</td>
</tr>
<tr>
<td></td>
<td>o Percentages</td>
</tr>
<tr>
<td></td>
<td>o Central tendency measures</td>
</tr>
<tr>
<td></td>
<td>o Crosstabs (by demographic factors and other variables)</td>
</tr>
<tr>
<td>To determine life-time, past year, and past month prevalence of marijuana use in adolescents.</td>
<td>Descriptive statistics:</td>
</tr>
<tr>
<td></td>
<td>o Frequencies</td>
</tr>
<tr>
<td></td>
<td>o Percentages</td>
</tr>
<tr>
<td></td>
<td>• Crosstabs (by demographic factors and other variables)</td>
</tr>
<tr>
<td>To explore the relationship between marijuana use and the perception of harm and benefits from using marijuana.</td>
<td>• Correlations between perceptions and marijuana use</td>
</tr>
<tr>
<td></td>
<td>• Crosstabs and $\chi^2$ for each measure and prevalence</td>
</tr>
<tr>
<td></td>
<td>• T-test if it is continuous</td>
</tr>
<tr>
<td>To explore the association between the perception of harm/benefits, demographic variables and the intention to use in the context of regulatory changes</td>
<td>• Descriptive statistics for intention to use (frequencies, percentages)</td>
</tr>
<tr>
<td></td>
<td>• Crosstabs for intention to use (by demographic factors and other variables)</td>
</tr>
<tr>
<td></td>
<td>Crosstabs harm/benefits by intention to use.</td>
</tr>
</tbody>
</table>
Limitations

The current study has some limitations. One is related to the participants’ selection: because it is a convenience sample, the findings cannot be generalized for the participating countries. Moreover, the current study is cross-sectional, so causality cannot be accrued from its results.

Drug use among adolescents is a complex phenomenon involving risk factors related within various domains (family, school, peers, community, and individual). The current study is focused on the perception of harm therefore cannot address the whole complexity of the phenomenon.

Finally, the study uses hypothetical situations regarding regulatory changes in each of the participating countries to explore intentions to use marijuana. Thereby, the results might not be useful for predicting future behaviour. Additionally, the non-uniformity in the regulatory framework across the participating countries may influence the analysis when the data is merged and compared between the sites. Nevertheless, the findings will be useful within current public policies debates and will be useful for educational purposes.
**Ethical Considerations**

The proposed study protocol will be based on the Ethical Conduct for Research Involving Humans developed by the Tri-Council Policy Statement in Canada, as required by the Research Ethics Board (REB) at the Centre for Addiction and Mental Health (CAMH). Additionally, each PI will obtain approval from the ethical committees at each affiliated institution or university.

After obtaining approval from the CAMH REB and the ethical committees from other participating countries, approval will be collected from all relevant authorities to conduct the research (such as local schools). Active consent will be obtained from parents, it will still be necessary to obtain assent from students.

Each participant will be informed that participation is voluntary (with no incentives), about the minimal risk involved in participation, and that their anonymity will be carefully ensured.

Specific ethical considerations will include:

- Obtaining REB approval (CAMH, CICAD, university/institution, and school);
- Obtaining active informed consent of the parents and assent for the students: consent/assent form is included in Appendices 5;
- Evaluating the risks and benefits to participants and researchers;
- Disclosing any conflicts of interest;
- Ensuring privacy and confidentiality at all stages of the research; and
- Reporting scientific quality results.

The local PI will train and supervise each RA, who will each be required to sign a confidentiality agreement before committing to the study.
All collected questionnaires will be sealed immediately and returned to the local PI within 48 hours, who will then lock the questionnaires in a cabinet. When possible, consent forms will be locked in a separate cabinet. Once the data have been entered into the database, the files will be password-protected, and any hard and soft copies of the files will be locked in the cabinet with the questionnaires. All files will be stored for the time period specified by the ethical committee at each university/institution.
**Budget**

The estimation of the budget per country is based on the funding from CICAD in the amount of $500 dollars. The detailed distribution of the money is in the Appendix 6. If additional finance is necessary it will be obtained by the principal investigator of each country.
Knowledge Transfer Plan

The study findings will help inform future implementation of prevention programs in schools in each participating country intended to inform adolescents about the risk of harm from marijuana use.

The multi-disciplinary and academic representatives in each country participating will play a key role in the knowledge transfer plan. The first step will be the dissemination of the findings to the scientific community and peer groups through the CICAD publication of the final report. Also, the PIs in each country will present their own findings at their university/institution and to other professionals via congresses, conferences, seminars, etc.

The second step will be presenting the findings to school staff, parents, and students using PowerPoint presentations, and providing a brief written report to each participating school.

The final step in the knowledge transfer plan will be presenting the results to the relevant drug agency in each participating city, specifically the key outcomes of the results and how the findings may affect the community.
References


drome.2.aspx


James, A., James, C., & Thwaites, T. (2013). The brain effects of cannabis in healthy adolescents and in adolescents with schizophrenia: a systematic review. *Psychiatry*
PERCEPTION OF HARMS AND BENEFITS AND MARIJUANA USE


APPENDICES
Appendix 1

Schedule of Proposed Activities

<table>
<thead>
<tr>
<th>Activities</th>
<th>GANTT CHART 2014-2015</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2014</td>
</tr>
<tr>
<td></td>
<td>June</td>
</tr>
<tr>
<td>1. Selection of the topic</td>
<td></td>
</tr>
<tr>
<td>2. Problem discussion and definition</td>
<td></td>
</tr>
<tr>
<td>3. Objectives</td>
<td></td>
</tr>
<tr>
<td>4. Methodology agreements</td>
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</tr>
<tr>
<td>5. Group organization</td>
<td></td>
</tr>
<tr>
<td>6. Introduction and Justification</td>
<td></td>
</tr>
<tr>
<td>7. Literature review</td>
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</tr>
<tr>
<td>8. Methods Draft</td>
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</tr>
<tr>
<td>9. Ethics course</td>
<td></td>
</tr>
<tr>
<td>10. Ethical considerations / forms</td>
<td></td>
</tr>
<tr>
<td>11. CV</td>
<td></td>
</tr>
<tr>
<td>12. Completed 1st draft</td>
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</tr>
<tr>
<td>13. Manual for CAMH REB</td>
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</tr>
<tr>
<td>14. Translation of documents</td>
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</tr>
<tr>
<td>15. Database development</td>
<td></td>
</tr>
<tr>
<td>16. Dictionary and syntax</td>
<td></td>
</tr>
<tr>
<td>17. Submit to the PI and comitee</td>
<td></td>
</tr>
<tr>
<td>18. Final revision and adjustments</td>
<td></td>
</tr>
<tr>
<td>19. Preparation of PPT presentation</td>
<td></td>
</tr>
<tr>
<td>20. Final presentation</td>
<td></td>
</tr>
<tr>
<td>21. Final revision</td>
<td></td>
</tr>
<tr>
<td>22. Ethical board revision in each country and</td>
<td></td>
</tr>
<tr>
<td>23. Pilot of the survey</td>
<td></td>
</tr>
<tr>
<td>24. School selection, contact and permission</td>
<td></td>
</tr>
<tr>
<td>25. Groups conformation and training for the research</td>
<td></td>
</tr>
<tr>
<td>26. Parents consent and students assent</td>
<td></td>
</tr>
<tr>
<td>27. Data collection</td>
<td></td>
</tr>
<tr>
<td>28. Data entry</td>
<td></td>
</tr>
<tr>
<td>29. Data analysis</td>
<td></td>
</tr>
<tr>
<td>30. Writing CICAD’s general report (all countries )</td>
<td></td>
</tr>
<tr>
<td>31. Country reports</td>
<td></td>
</tr>
<tr>
<td>32. Country paper writing and submission</td>
<td></td>
</tr>
<tr>
<td>33. Presentation of results</td>
<td></td>
</tr>
</tbody>
</table>
Appendix 2

Proposed Research Project Management Organogram
## Appendix 3

### Research Project Sites

<table>
<thead>
<tr>
<th>City/ Researcher Code</th>
<th>City / Researcher</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Belize City / Danladi Chiroma Husaini</td>
</tr>
<tr>
<td>2</td>
<td>Brasilia / Maria Ines Gandolfo Conceicao</td>
</tr>
<tr>
<td>3</td>
<td>Viña del Mar / Maria Gabriela Morgado</td>
</tr>
<tr>
<td>4</td>
<td>Concepción / Patricia Cid</td>
</tr>
<tr>
<td>5</td>
<td>Bogotá / Maria Fernanda Reyes</td>
</tr>
<tr>
<td>6</td>
<td>Santo Domingo / Guarionex Gomez</td>
</tr>
<tr>
<td>7</td>
<td>Manchester / Jason R. Wynter</td>
</tr>
<tr>
<td>8</td>
<td>Mexicali / Karina Rivera</td>
</tr>
<tr>
<td>9</td>
<td>Basseterre / Gaile A. Gray-Phillip</td>
</tr>
<tr>
<td>10</td>
<td>Saint Joseph / Narsha A. Modeste</td>
</tr>
</tbody>
</table>
### Appendix 4

#### STUDE NTS SURVEY – CAPACITY BUILDING PROGRAM 2014-2015

The (INSTITUTION) in collaboration with the Inter-American Drug Control Commission (CICAD) is conducting a survey of secondary school students in (CITY) about marijuana use. This survey is currently being conducted in nine countries. There are NO right or wrong responses to the questions.

THIS IS NOT A TEST. Please DO NOT put your name on this form, the information is private and confidential. Therefore, please be completely honest when answering the questions.

The following questions are followed by a list of answers. Please tick in one of the boxes the option that best represents your choice. Kindly answer all the questions.

<table>
<thead>
<tr>
<th>Questionnaire Number</th>
<th>School ID</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Country code</th>
<th>Student ID #</th>
<th>Year</th>
<th>Month</th>
<th>Day</th>
</tr>
</thead>
</table>

1. **Sex:**
   - 1 □ Male 2 □ Female

2. **Age:** (at last birthday):
   - □ 15 years □ 16 years □ 17 years
   - □ 18 years or over

3. **What grade/form are you in? ______

The next 7 questions are about marijuana (pot, grass, ganja, weed). Please answer all the questions, even if you have never tried marijuana.

4. **How many of your closest friends use marijuana (pot, grass, ganja, weed)?**
   - 1 □ None of my friends
   - 2 □ Some of my friends
   - 3 □ About half of my friends
   - 4 □ All of my friends
   - 5 □ Don’t know

5. **Have you ever smoked marijuana (pot, grass, ganja, weed)?**
   - 1 □ Yes
   - 0 □ No

5a. **How old were you when you smoked marijuana (pot, grass, ganja, weed) for the first time?**

   Age: ______(years)
   - 0 □ Never used marijuana in lifetime

6. **How often have you smoked marijuana (pot, grass, ganja, weed) over the PAST 12 MONTHS?**
   - 1 □ Did not smoke marijuana in the past 12 months
   - 2 □ Just once (for the past 12 months)
   - 3 □ Several times (for the past 12 months)
   - 4 □ Several times a month (for the past 12 months)
   - 5 □ Several times a week (for the past 12 months)
   - 6 □ Every day (for the past 12 months)

7. **How often have you smoked marijuana (pot, grass, ganja, weed) over the PAST 30 DAYS?**
   - 1 □ Did not smoke marijuana in the past 30 days
   - 2 □ Just once (for the past 30 days)
   - 3 □ Several times (for the past 30 days)
   - 4 □ Several times a day (for the past 30 days)
   - 5 □ Several times a week (for the past 30 days)
   - 6 □ Every day (for the past 30 days)
We would like to know your opinions about marijuana (pot, grass, ganja, weed) use. How much do you think people risk harming themselves (physically or in other ways) if they do the following?

8. Try marijuana (pot, grass, ganja, weed) once or twice?
   1 □ No risk
   2 □ Slight risk
   3 □ Moderate risk
   4 □ Great risk
   5 □ I don’t know

9. Smoke marijuana (pot, grass, ganja, weed) occasionally?
   1 □ No risk
   2 □ Slight risk
   3 □ Moderate risk
   4 □ Great risk
   5 □ I don’t know

10. Smoke marijuana (pot, grass, ganja, weed) regularly?
    1 □ No risk
    2 □ Slight risk
    3 □ Moderate risk
    4 □ Great risk
    5 □ I don’t know

The questions 11 to 23 ask about your opinions about marijuana use. Please choose the option that best suits your opinions.

11. In your opinion, to what extent are the potential risks (dangers) associated with smoking marijuana known to people your age?

<table>
<thead>
<tr>
<th>Risks are</th>
<th>Risk are</th>
<th>Risk are</th>
<th>Unsure</th>
<th>Risk are</th>
<th>Risks are</th>
</tr>
</thead>
<tbody>
<tr>
<td>definitely not known</td>
<td>not known</td>
<td>slightly not known</td>
<td>known</td>
<td>slightly known</td>
<td>very well known</td>
</tr>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
</tbody>
</table>

12. In your opinion, to what extent are the potential risks (dangers) associated with smoking marijuana frightening for people your age?

<table>
<thead>
<tr>
<th>Definitely Not Frightening</th>
<th>Not frightening</th>
<th>Slightly not frightening</th>
<th>Unsure</th>
<th>Slightly Frightening</th>
<th>Frightening</th>
<th>Definitely Frightening</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
</tr>
</tbody>
</table>

13. If you did smoke marijuana, to what extent do you believe that you would be personally at risk (danger) of harm?

<table>
<thead>
<tr>
<th>Definitely Not at risk</th>
<th>Not at risk</th>
<th>Slightly not at risk</th>
<th>Unsure</th>
<th>Slightly at risk</th>
<th>At risk</th>
<th>Definitely at risk</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
</tr>
</tbody>
</table>
14. If a person of your age engaged in smoking marijuana, to what extent do you believe that they would be at risk of harm?

<table>
<thead>
<tr>
<th>Definitely not at risk</th>
<th>Not at risk</th>
<th>Slightly not at risk</th>
<th>Unsure</th>
<th>Slightly at risk</th>
<th>At risk</th>
<th>Definitely at risk</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
</tr>
</tbody>
</table>

15. To what extent are you influenced by your friends to smoke marijuana?

<table>
<thead>
<tr>
<th>Not at all influenced</th>
<th>Not influenced</th>
<th>Slightly not influenced</th>
<th>Unsure</th>
<th>Slightly influenced</th>
<th>Influenced</th>
<th>Greatly influenced</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
</tr>
</tbody>
</table>

16. In your opinion, to what extent can a person your age avoid smoking marijuana?

<table>
<thead>
<tr>
<th>Definitely can be avoided</th>
<th>Can be avoided</th>
<th>Can be slightly avoided</th>
<th>Unsure</th>
<th>Can be slightly difficult to avoid</th>
<th>Cannot be avoided</th>
<th>Definitely cannot be avoided</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
</tr>
</tbody>
</table>

17. In your opinion, to what extent are teenagers who are smoking marijuana, admired by their friends?

<table>
<thead>
<tr>
<th>Not at all admired</th>
<th>Not admired</th>
<th>Slightly not admired</th>
<th>Unsure</th>
<th>Slightly admired</th>
<th>Admired</th>
<th>Greatly admired</th>
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</thead>
<tbody>
<tr>
<td>1</td>
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<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
</tr>
</tbody>
</table>

18. In your opinion, to what extent are the potential pleasures or other benefits provided by smoking marijuana greater than the potential risks associated with it?

<table>
<thead>
<tr>
<th>Risk much greater than benefits</th>
<th>Risk greater than benefits</th>
<th>Risk slightly greater than benefits</th>
<th>Unsure</th>
<th>Benefits slightly greater than risk</th>
<th>Benefits greater than risk</th>
<th>Benefits much greater than risk</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
</tr>
</tbody>
</table>

19. In your opinion, to what extent can smoking marijuana help persons in your age group to cope with their emotional difficulties?

<table>
<thead>
<tr>
<th>Definitely not helps to cope</th>
<th>Not help to cope</th>
<th>Slightly does not help to cope</th>
<th>Unsure</th>
<th>Help slightly to cope</th>
<th>Helps to cope</th>
<th>Definitely helps to cope</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
</tr>
</tbody>
</table>

20. In your opinion, to what extent can smoking marijuana improve physical well-being among persons your age group?

<table>
<thead>
<tr>
<th>Definitely not improved</th>
<th>Not improved</th>
<th>Slightly not improved</th>
<th>Unsure</th>
<th>Slightly improved</th>
<th>Improved</th>
<th>Greatly improved</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
</tr>
</tbody>
</table>
21. In your opinion, to what extent does smoking marijuana improve academic performance?

<table>
<thead>
<tr>
<th>Definitely not improved</th>
<th>Not improved</th>
<th>Slightly not improved</th>
<th>Unsure</th>
<th>Slightly improved</th>
<th>Improved</th>
<th>Definitely improved</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
</tr>
</tbody>
</table>

22. If you were 18 years of age and marijuana was legal, which of the following would you most likely do?
   1 □ Not use it, even if it were legally available
   2 □ Try it
   3 □ Use it about as often as I do now
   4 □ Use it more often than I do now
   5 □ Use it less than I do now
   6 □ Don’t know

23. Do you think that marijuana:
   1 □ Should not be used at all
   2 □ Should be used for medical purposes
   3 □ Should be used for recreational purposes
   4 □ Should be used for medical and recreational purposes
   5 □ I don’t know

END OF QUESTIONNAIRE

Thank you for participating!
Appendix 5

INFORMATION AND CONSENT / ASSENT FORM FOR PARENTS AND STUDENTS


Dear parent/guardian and student:

My name is (name of primary investigator) and I’m a teacher and researcher in the (name of university/institution). I am part of a research project supported by the Centre for Addiction and Mental Health (CAMH) and the Inter-American Drug Abuse Control Commission (CICAD). This research is being conducted in Belize, Brazil, Chile, Colombia, Dominican Republic, Jamaica, Mexico, St. Kitts and Nevis and Trinidad and Tobago. The purpose of the study is to find out students’ perceptions of harms and benefits associated with marijuana use.

For this study 268 students (at each site) 15 to 17 years old will be asked to participate. Your child has been asked to participate. Each participant was randomly (by chance) selected. Your daughter/son will be asked to complete a paper-pencil questionnaire in a classroom in her/his school. We are interested in the perception of both users and non users, so there is no assumption that students who complete this anonymous survey have ever used marijuana.

Participation is voluntary and students do not have to answer every question and they can stop at any time - If they decide to leave the study we will destroy their questionnaire. Refusal to participate or not to answer certain questions will not affect the student’s relationship with the school or teachers. Completing the questionnaire has very low risk of experiencing some anxiety or distress from answering questions about drug use. Drug use information will be made available at the school level that students can access. Students will be told to not write their names on the questionnaire. Each questionnaire is coded, so students can never be identified or linked to school records. The information provided will not be traced back to you or your daughter/son. Confidentiality will be respected within the fullest extent possible by law. Data will be stored in locked cabinets and password-protected files for an indefinite period.

Your participation in this study will help the research team better understand how adolescents perceive marijuana as a potential risk of harm or benefit, and the intention to use within the context of regulatory changes. I sincerely appreciate your co-operation. If you would like to receive more information about the study, please contact me at (phone number) or (e-mail). This study has also been approved by (ethics board in each country) and (school board or school principal). As part of the Research Services Quality Assurance Program, this study may be monitored and/or audited by a member of the Quality Assurance Team. Your research records and CAMH records may be reviewed during which confidentiality will be maintained as per CAMH policies and extent permitted by law.

Country PI signature
We have read the request for participation in the study "Perception of harms and benefits associated with marijuana use among adolescents aged 15-17". We have discussed it and have decided....

Parent/Guardian Consent:

_____ I give permission for my daughter/son (name of student) to participate

_____ I do not give permission for my daughter/son (name of student) to participate

Signature of parent/guardian________________________________date_____________________
Name of parent/Guardian___________________________________________________________

Student Assent:

_____ I agree to participate                      _____ I do not agree to participate

Signature of Student________________________________date__________________________
Name of student_______________________________________________________________
Appendix 6

INDIVIDUAL COUNTRY BUDGET

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
<th>Cost/Unit</th>
<th>Number</th>
<th>Total Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Personnel</td>
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<td></td>
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<td></td>
</tr>
<tr>
<td></td>
<td>Data Entry</td>
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<td>50.00</td>
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<tr>
<td></td>
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<td>200.00</td>
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<tr>
<td>Materials</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Stationery (pen, pencil, clipboard)</td>
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<td>4</td>
<td>40.00</td>
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<tr>
<td></td>
<td>Questionnaires and informed consent</td>
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<td>268</td>
<td>134.0</td>
</tr>
<tr>
<td>Communication</td>
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<td></td>
<td></td>
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<tr>
<td></td>
<td>Phone</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Transportation</td>
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<td></td>
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</tr>
<tr>
<td></td>
<td>Public travel (bus, taxi)</td>
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</tr>
<tr>
<td></td>
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<tr>
<td></td>
<td><strong>Contingency 10%</strong></td>
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<td>50.00</td>
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<tr>
<td></td>
<td><strong>Total</strong></td>
<td></td>
<td></td>
<td><strong>550.00</strong></td>
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</table>