



HOUSE OF COMMONS  
CHAMBRE DES COMMUNES  
CANADA

# **MARIJUANA'S HEALTH RISKS AND HARMS**

## **Report of the Standing Committee on Health**

**Ben Lobb  
Chair**

**OCTOBER 2014**

**41<sup>st</sup> PARLIAMENT, SECOND SESSION**

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# **THE STANDING COMMITTEE ON HEALTH**

has the honour to present its

## **SIXTH REPORT**

Pursuant to its mandate under Standing Order 108(2), the Committee has studied marijuana's health risks and harms and has agreed to report the following:





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# MARIJUANA'S HEALTH RISKS AND HARMS

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## Introduction

On 29 April 2014, the House of Commons Standing Committee on Health (“the Committee”) passed a motion agreeing to undertake a study of no more than five meetings examining the scientific evidence related to the health risks and harms associated with the use of marijuana.<sup>1</sup> The Committee further agreed that the study would focus in particular on the state of knowledge around the health risks of marijuana use, including its addiction potential and effects on the developing brain, as well as the level of awareness among Canadians regarding the health risks and harms associated with marijuana use.<sup>2</sup> During the course of its five-meeting study, the Committee heard from numerous witnesses, including government officials, representatives of the medical profession and recognized experts with peer-reviewed publications in medical and scientific journals. This report summarizes testimony from these hearings and identifies possible ways that the federal government could continue to work towards reducing the health risks and harms associated with marijuana use.

## Overview of Marijuana and its Use in Canada

### A. What is Marijuana?

Marijuana is the common name for *Cannabis sativa*, a hemp plant that grows throughout temperate and tropical climates.<sup>3</sup> The leaves and flowering tops of *C. sativa* plants contain at least 489 distinct compounds.<sup>4</sup> Among these compounds, delta-9-tetrahydrocannabinol (delta-9-THC or THC) is responsible for many, if not most, of the euphoric and addictive effects of cannabis, stimulating the cannabinoid 1 (CB1) and cannabinoid 2 (CB2) receptors of the endocannabinoid (eCB) system.<sup>5</sup> The eCB system is a lipid signalling system that plays a role in regulating a number of physiological as well as pathophysiological processes in humans, such as neural development, immune function, inflammation, appetite, metabolism and energy homeostasis, cardiovascular function, digestion, bone development and bone density, synaptic plasticity and learning, pain, reproduction, psychiatric disease, psychomotor behaviour, memory, wake and sleep

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1 House of Commons Standing Committee on Health (HESA), [Minutes of Proceedings](#), 2<sup>nd</sup> Session, 41<sup>st</sup> Parliament, 29 April 2014.

2 Ibid.

3 Health Canada, “[Information for Health Care Professionals: Cannabis \(marihuana, marijuana\) and the cannabinoids](#),” February 2013.

4 Ibid.

5 HESA, [Evidence](#), 2<sup>nd</sup> Session, 41<sup>st</sup> Parliament, 8 May 2014, 0850 (Dr. Bernard Le Foll, Professor, University of Toronto, as an Individual).

cycles, and the regulation of stress and emotional states.<sup>6</sup> The plant also contains other cannabinoids, such as cannabitol, cannabidiol and cannabichromene, which are present in lesser amounts and have fewer, if any, psychotropic properties.<sup>7</sup>

There are many different strains of *C. sativa* and their cannabinoid content varies based on a number of factors including soil and climate conditions, as well as cultivation techniques.<sup>8</sup> Most of the current scientific research available focuses on plant strains that contain high levels of THC and cannabidiol (CBD), whereas less is known about the effects of other plant strains.<sup>9</sup> The Committee heard that the marijuana available in Canada today has a higher THC content than marijuana available in the past. According to a Health Canada official who appeared before the Committee, the THC content in marijuana increased steadily between 1988 and 2010 based upon data from Health Canada's drug analysis service, a trend that has also been seen in other jurisdictions such as Europe and the United States.<sup>10</sup> Data from the United States indicates that the THC content of marijuana increased from approximately 1% in the 1980s to between 10% and 11% in 2011, whereas marijuana cultivated indoors on the west coast of Canada can have a THC content of upwards of 30%.<sup>11</sup> A Health Canada official indicated that greater mental and physical harms could potentially result from the use of marijuana with higher levels of THC.<sup>12</sup>

## **B. Prevalence of Marijuana Use in Canada**

### **1. General Population**

According to an official from Health Canada, data from the 2012 Canadian Alcohol and Drug Use Monitoring Survey (CADUMS) shows that marijuana is the most commonly used illicit substance in Canada.<sup>13</sup> In 2012, 10.2% of the Canadian population reported using marijuana in the past year, with men nearly twice as likely to report marijuana use in comparison to women.<sup>14</sup> Meanwhile, 41.5% of Canadians have reported using cannabis at

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6 Health Canada, "[Information for Health Care Professionals: Cannabis \(marihuana, marijuana\) and the cannabinoids](#)," February 2013.

7 Ibid.

8 Ibid.

9 HESA, [Evidence](#), 2<sup>nd</sup> Session, 41<sup>st</sup> Parliament, 8 May 2014, 0850 (Dr. Bernard Le Foll).

10 HESA, [Evidence](#), 2<sup>nd</sup> Session, 41<sup>st</sup> Parliament, 1 May 2014, 0845 (Hilary Geller, Assistant Deputy Minister, Healthy Environments and Consumer Safety Branch, Department of Health)

11 HESA, [Evidence](#), 2<sup>nd</sup> Session, 41<sup>st</sup> Parliament, 6 May 2014, 0850 (Dr. Kevin Sabet, Executive Director, Smart Approaches to Marijuana).

12 HESA, [Evidence](#), 2<sup>nd</sup> Session, 41<sup>st</sup> Parliament, 1 May 2014, 0845 (Hilary Geller).

13 Ibid.

14 Ibid.

least once in their lifetime.<sup>15</sup> Approximately a quarter of Canadians who reported using cannabis in the last three months are considered to be chronic users who use cannabis on a daily basis.<sup>16</sup> Results of the Canadian Community Health Survey showed that approximately 1% of Canadian adults aged 25 to 64 met the criteria for abuse or dependence in 2012.<sup>17</sup>

A written submission provided to the Committee by Dr. Perry Kendall indicated that, based upon the 2011 CADUMS data, approximately 17.7% of the Canadian population aged 15 or older who used cannabis in the past year did so for medical purposes.<sup>18</sup> Approximately 50% of individuals who used cannabis for medical purposes did so to relieve chronic pain caused by conditions such as arthritis, back pain and migraines, while the remaining half used cannabis for one of a variety of conditions that include insomnia, depression and anxiety.<sup>19</sup>

## 2. Youth

The Committee heard that the rate of marijuana use among youth is twice as high as that of adults, with 20.3% of Canadian youth reporting past-year use in 2012.<sup>20</sup> The average age of initiation of use among youth has remained unchanged over the past seven years at approximately 15.6 years.<sup>21</sup> A Public Health Agency of Canada (PHAC) survey that examined health behaviour in school-aged children in 2009–2010 found that between 10% and 12% of youth in grades 9 and 10 reported using marijuana three or more times in the past 30 days.<sup>22</sup> In addition, the Committee heard that a recent UNICEF study found that Canadian youth aged 11 to 15 are among the highest users of marijuana compared to their peers in other developed countries, with 28% reporting using cannabis at least once in the past year.<sup>23</sup> According to the Canadian Community Health Survey,

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- 15 Health Canada, [Canadian Alcohol and Drug Use Monitoring Survey \(CADUMS\)](#), *Summary of Results for 2012*.
- 16 HESA, [Evidence](#), 2<sup>nd</sup> Session, 41<sup>st</sup> Parliament, 6 May 2014, 0900 (Michel Perron, Chief Executive Officer, Canadian Centre on Substance Abuse).
- 17 Ibid, 0905.
- 18 Dr. Perry Kendall, Public Health Officer, Government of British Columbia, “Cannabis Related Benefits and Harms: Information to Assist in Decision Making about Cannabis Policy,” 21 May 2014.
- 19 Ibid.
- 20 HESA, [Evidence](#), 2<sup>nd</sup> Session, 41<sup>st</sup> Parliament, 1 May 2014, 0850 (Hilary Geller).
- 21 Dr. Perry Kendall, “Cannabis Related Benefits and Harms: Information to Assist in Decision Making about Cannabis Policy,” 21 May 2014.
- 22 Ibid.
- 23 HESA, [Evidence](#), 2<sup>nd</sup> Session, 41<sup>st</sup> Parliament, 1 May 2014, 0950 (Dr. Meldon Kahan, Medical Director, Women’s College Hospital, as an Individual).

over 5% of young Canadians aged 15 to 24 met the criteria for cannabis abuse or dependence in 2012.<sup>24</sup>

### **C. Perceptions of the Health Risks and Harms of Marijuana Use among Canadians**

Witnesses appearing before the Committee explained that Canadians have a lack of awareness about the health risks and harms associated with the use of marijuana, viewing it instead as a benign substance. An opinion survey conducted by the federal government's National Anti-Drug Strategy (NADS) found that while both parents and youth are aware of the risks and harms of drugs such as cocaine, crack, ecstasy, and crystal meth, very few identified marijuana as being harmful.<sup>25</sup> PHAC's health behaviour in school-aged children study also found that youth in grades 9 and 10 felt that there were slight or no potential health risks associated with the use of the drug.<sup>26</sup>

A representative from the Canadian Centre on Substance Abuse (CCSA) explained that a survey conducted by the organization found that Canadian youth are very confused about the effects of cannabis use.<sup>27</sup> Some individuals who participated in the survey believed that cannabis helps improve their focus at school and that the drug could prevent or cure cancer. Youth surveyed were also uncertain as to whether cannabis improves or impairs driving performance, and believed that smoking marijuana before driving was not as dangerous as drinking and driving. Finally, the youth who were interviewed also saw cannabis as a natural product and therefore did not think of it as a drug. The Committee heard from a Health Canada official that the availability of medical marijuana in Canada and debates surrounding legalization in the United States may have contributed to confusion about the nature and effects of cannabis.<sup>28</sup>

Meanwhile, a representative from the Royal Canadian Mounted Police (RCMP) indicated that a 2013 study by the Canadian Council of Motor Transport Administrators found that though the individuals surveyed generally agreed that alcohol impairs a person's ability to drive a motor vehicle, only 68% felt that cannabis impairs driving ability.<sup>29</sup> Furthermore, while the majority recognized that a driver could be charged for alcohol-impaired driving, 26% of people did not believe that a driver could be charged for driving while impaired by cannabis.

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24 HESA, [Evidence](#), 2<sup>nd</sup> Session, 41<sup>st</sup> Parliament, 6 May 2014, 0905 (Michel Perron).

25 HESA, [Evidence](#), 2<sup>nd</sup> Session, 41<sup>st</sup> Parliament, 1 May 2014, 0850 (Hilary Geller).

26 Ibid.

27 HESA, [Evidence](#), 2<sup>nd</sup> Session, 41<sup>st</sup> Parliament, 6 May 2014, 0900 (Michel Perron).

28 HESA, [Evidence](#), 2<sup>nd</sup> Session, 41<sup>st</sup> Parliament, 1 May 2014, 0850 (Hilary Geller).

29 Inspector J.R. Taplin, "Speaking Notes for Insp. J.R. TAPLIN: Appearance before the House of Commons Standing Committee on Health, Topic: Marijuana: Health Risks and Harms," 27 May 2014.

Finally, the Committee heard that the high rates of marijuana use among Canadians may be attributable to the perception that marijuana is a substance without any negative effects. One witness explained that in a survey of adults in three countries, Canadians were more likely to view cannabis as harmless and were more likely to have tried cannabis than adults in Sweden or Finland.<sup>30</sup> A survey of American senior high school students also found that there was an increase in marijuana smoking rates from 2.4% to 6.5% between 1993 and 2013, which was associated with a decline in the percentage (from 70% to 40%) over the same period of senior high school students who believed that regular marijuana smoking was harmful.<sup>31</sup>

However, several witnesses expressed concern about the gap between Canadians' perception of marijuana as a benign substance and current and emerging scientific evidence about its health risks and harms, particularly as the latter relate to vulnerable population groups such as youth.<sup>32</sup> Consequently, the witnesses felt that there is a need to raise awareness about the current and emerging scientific evidence about the health risks and harms of marijuana.<sup>33</sup>

#### **D. Impact of Marijuana Use on the Health Care System**

The Committee also received testimony about the impact marijuana use is having on health care systems across Canada. According to the CCSA's 2014 *National Treatment Indicators Report*, cannabis is the second most commonly used illicit drug among individuals accessing publicly funded addiction treatment services.<sup>34</sup> A Health Canada official appearing before the Committee also indicated that hospital data from the Canadian Institute for Health Information (CIHI) demonstrate that there has been an increase in marijuana-related hospitalizations.<sup>35</sup> In 2007–2008, there were 598 cases<sup>36</sup> where marijuana was considered the principal cause of the hospitalization.<sup>37</sup> The number of cases increased to 908 in 2012–2013.<sup>38</sup>

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30 HESA, [Evidence](#), 2<sup>nd</sup> Session, 41<sup>st</sup> Parliament, 1 May 2014, 0950 (Dr. Meldon Kahan).

31 Ibid, 0955.

32 HESA, [Evidence](#), 2<sup>nd</sup> Session, 41<sup>st</sup> Parliament, 6 May 2014, 0905 (Michel Perron) and 0940 (Dr. Kevin Sabet); HESA, [Evidence](#), 2<sup>nd</sup> Session, 41<sup>st</sup> Parliament, 1 May 2014, 0850 (Hilary Geller).

33 Ibid.

34 HESA, [Evidence](#), 2<sup>nd</sup> Session, 41<sup>st</sup> Parliament, 1 May 2014, 0850 (Hilary Geller).

35 Ibid.

36 It is important to note that the number of cases represents admissions or care encounters, not unique patients, so the same individual can be counted more than once in a year.

37 Canadian Institute of Health Information (CIHI) "CIHI Data on Marijuana-related Hospitalizations and Ambulatory Care Encounters (including Emergency Departments)" submitted to the Committee by Health Canada on 12 May 2014.

38 Ibid.

Data from CIHI also indicate that the total number of cases<sup>39</sup> where any diagnosis was related to marijuana use, which resulted in ambulatory care encounters, including emergency department visits that may have resulted in hospitalizations, increased from 11,869 in 2007–2008 to 20,751 in 2012–2013.<sup>40</sup> It is important to note that the number of marijuana-related cases that resulted in hospitalizations also includes hospitalization cases where day surgery was required, but it was unlikely that the day surgeries were related to marijuana use.<sup>41</sup> Another study based on 2002 data found that 0.3% of total hospitalizations in Canada could be attributed to cannabis use compared to 5.8% for alcohol use, 1.4% for the use of other illegal drugs and 10.3% for tobacco use.<sup>42</sup>

## Scientific Evidence Related to the Health Risks and Harms of Marijuana Use

Witnesses appearing before the Committee summarized the current status of research related to the health risks and harms of marijuana use in a broad range of areas, including cognitive functioning and brain development; mental health and addiction; respiratory effects; cardiovascular disease; and motor vehicle accidents. This testimony, which also highlighted in particular how youth are at greater risk for these possible negative health effects, is outlined in the sections below.

### A. Cognitive Functioning and Brain Development

According to a representative of the CCSA, the research is clear that there are negative impacts on cognitive function immediately upon using cannabis, or what is considered to be “acute use”.<sup>43</sup> Specifically, marijuana impairs concentration and decision-making abilities, reaction time, memory and executive functioning – abilities that are required to safely operate a vehicle or to pay attention in school or go to work. These cognitive functions are further impaired when cannabis use is combined with alcohol.<sup>44</sup> Dr. Meldon Kahan further detailed that, “there is a strong relationship between cannabis use and anxiety and mood disorders as well as suicidal ideation. Acute cannabis use can trigger anxiety and panic attacks.”<sup>45</sup> Dr. Zach Walsh also explained that these acute cognitive effects can vary considerably across individuals, with more profound

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39 It is important to note that the number of cases represents admissions or care encounters, not unique patients, so the same individual can be counted more than once in a year.

40 Canadian Institute of Health Information (CIHI) “CIHI Data on Marijuana-related Hospitalizations and Ambulatory Care Encounters (including Emergency Departments)” submitted to the Committee by Health Canada on 12 May 2014.

41 Ibid.

42 Dr. Perry Kendall, “Cannabis Related Benefits and Harms: Information to Assist in Decision Making about Cannabis Policy,” submitted to the Committee on 21 May 2014.

43 HESA, [Evidence](#), 2<sup>nd</sup> Session, 41<sup>st</sup> Parliament, 6 May 2014, 0900 (Michel Perron).

44 Ibid. 0930.

45 HESA, [Evidence](#), 2<sup>nd</sup> Session, 41<sup>st</sup> Parliament, 1 May 2014, 0950 (Dr. Meldon Kahan).



cognitive effects being experienced by infrequent cannabis users rather than by regular users who have developed a tolerance for the drug.<sup>46</sup>

The Committee learned that cognitive impairment from acute marijuana use can affect a person up to a month after using the drug. Professor Harold Kalant explained that among adults, these physical and mental effects usually disappear on cessation of use.<sup>47</sup> Dr. Kahan explained that for daily or chronic users, these cognitive deficits may continue to persist even after a period of abstinence, but that existing long-term studies were only observational in nature.<sup>48</sup> In addition, Dr. Walsh pointed out to the Committee that a comprehensive meta-analysis study had concluded that there were divergent views on the effects of long-term regular cannabis consumption on the neurocognitive functioning of users, noting, “cannabis use may lead to earlier age of onset of schizophrenia among some vulnerable individuals and may also lead to some worse outcomes among those with a history of psychotic disorders.”<sup>49</sup>

With respect to youth, the Committee heard that emerging scientific evidence demonstrated that regular or chronic use, defined as more than one joint per week, has a long-term impact on the cognitive functioning of this population group.<sup>50</sup> In her appearance before the Committee, Dr. Andra Smith explained that her research comparing brain activity among young adults (aged 18 to 21) who are regular marijuana users to the brain activity of young adults who do not smoke marijuana regularly has found that young adults who regularly use marijuana have to recruit more regions of their brains to perform tasks.<sup>51</sup> Dr. Smith said that the need to recruit more regions of the brain to complete a task reflects compensation for deficits in other areas of the brain.

Functional Magnetic Resonance Imaging (fMRI) used during the study revealed that the area of the brain most affected by marijuana use is the prefrontal cortex, the area of the brain responsible for executive cognitive functions, including decision making, planning, organizing behaviour, and setting and achieving goals, while inhibiting inappropriate responses and maintaining mental focus.<sup>52</sup> Deficits in the prefrontal cortex meant that study participants had to rely on other regions of the brain, such as the limbic system and/or posterior regions of the brain, to complete executive cognitive tasks. However, the Committee heard that these regions are not as well developed to undertake

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46 HESA, [Evidence](#), 2<sup>nd</sup> Session, 41<sup>st</sup> Parliament, 13 May 2014, 0940 (Dr. Zach Walsh, Associate Professor, University of British Columbia, as an Individual).

47 HESA, [Evidence](#), 2<sup>nd</sup> Session, 41<sup>st</sup> Parliament, 1 May 2014, 1000 (Professor Harold Kalant, University of Toronto, as an Individual).

48 HESA, [Evidence](#), 2<sup>nd</sup> Session, 41<sup>st</sup> Parliament, 1 May 2014, 0950 (Dr. Meldon Kahan).

49 HESA, [Evidence](#), 2<sup>nd</sup> Session, 41<sup>st</sup> Parliament, 13 May 2014, 0850 (Dr. Zach Walsh).

50 HESA, [Evidence](#), 2<sup>nd</sup> Session, 41<sup>st</sup> Parliament, 6 May 2014, 0850 (Dr. Andra Smith, Associate Professor, University of Ottawa).

51 Ibid.

52 Ibid.

executive cognitive functions as the prefrontal cortex, and are considered to be the “emotional brain.”<sup>53</sup> The Committee heard that the impact of marijuana use on the prefrontal cortex of the brain was particularly significant in relation to youth, as this part of the brain undergoes key phases of neuronal development during adolescence. As marijuana use during this period hijacks the development of the prefrontal cortex, youth are therefore more vulnerable to the neurotoxic effects of marijuana use.<sup>54</sup>

The Committee heard from some witnesses that epidemiological research also supports these findings with regards to youth.<sup>55</sup> For example, the “Dunedin Study” followed 1,037 individuals born in Dunedin, New Zealand in 1972–1973. The study included repeated interviews and examinations every two to three years throughout childhood. The most recent follow-up was conducted in 2010–2012 when the participants were aged 38. The study showed that individuals who began to use marijuana regularly showed losses in intellectual function at 13 years of age, including a drop in IQ of between 6 and 8 points.<sup>56</sup> These losses were greatest among participants who were the highest users of marijuana and individuals who had started smoking at an early age. These mental health effects resulted in more school dropouts, poorer social adjustment and a greater risk of depression later in life. However, Dr. Walsh pointed out in his appearance before the Committee that substantial concerns have been raised in various publications about the findings of the Dunedin Study, particularly that other factors besides marijuana use may have played a role in the changes in IQ levels reported in the study, such as socio-economic status and personality characteristics linked to rule breaking and anti-social behaviour.<sup>57</sup>

Finally, the Committee learned that exposure to prenatal marijuana use also has an impact on the intellectual development of children, based upon the findings of the Ottawa Prenatal Prospective Study (OPPS), which followed groups of offspring of mothers who smoked cannabis during pregnancy and compared them to the offspring of mothers who smoked tobacco or did not smoke any substance at all from birth until young adulthood.<sup>58</sup> The OPPS found that children of mothers who smoked cannabis during pregnancy experienced mental effects beginning at school age that persisted throughout their growth and development and into their adult years. Though these mental changes were considered minor, they were sufficient to affect the children’s educational attainment.

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53     Ibid.

54     Ibid.

55     HESA, [Evidence](#), 2<sup>nd</sup> Session, 41<sup>st</sup> Parliament, 1 May 2014, 0950 (Dr. Meldon Kahan); HESA, [Evidence](#), 2<sup>nd</sup> Session, 41<sup>st</sup> Parliament, 6 May 2014, 0850 (Dr. Andra Smith); HESA, [Evidence](#), 2<sup>nd</sup> Session, 41<sup>st</sup> Parliament, 6 May 2014, 0910 (Dr. Kevin Sabet).

56     HESA, [Evidence](#), 2<sup>nd</sup> Session, 41<sup>st</sup> Parliament, 6 May 2014, 0915 (Dr. Kevin Sabet).

57     HESA, [Evidence](#), 2<sup>nd</sup> Session, 41<sup>st</sup> Parliament, 13 May 2014, 08 45 (Dr. Zach Walsh).

58     HESA, [Evidence](#), 2<sup>nd</sup> Session, 41<sup>st</sup> Parliament, 1 May 2014, 1000 (Professor Harold Kalant); HESA, [Evidence](#), 2<sup>nd</sup> Session, 41<sup>st</sup> Parliament, 6 May 2014, 0850 (Dr. Andra Smith).

According to witnesses appearing before the Committee, these findings on the impact of marijuana use on the brain development of youth, as well as children prenatally exposed to marijuana, highlight the need to raise awareness about the risks and harms of marijuana use, particularly among youth and pregnant women.<sup>59</sup>

## **B. Mental Health and Addiction**

### **1. Psychosis and Schizophrenia**

Dr. Romina Mizrahi explained to the Committee that cannabis can be considered a possible contributor to the development of schizophrenia in genetically vulnerable population groups.<sup>60</sup> According to Dr. Mizrahi, well-replicated epidemiological studies have shown a two- to six-fold increase in the incidence of schizophrenia with early cannabis use. This increase in reported risk for psychosis was associated with use of cannabis before the age of 15 and was dependent upon the dose of cannabis.

Dr. Mizrahi explained that, though not well understood, cannabis use and schizophrenia were linked through the eCB system in humans.<sup>61</sup> The eCB system plays a role in the development of schizophrenia through its regulation of the release of dopamine, a key neurotransmitter involved in schizophrenia. Meanwhile, cannabis also acts upon the CB1 and CB2 receptors of the eCB system to produce its physiological and psychological effects. In addition, the Committee heard that the eCB system undergoes significant changes during early life, which could potentially explain the sensitivity of adolescents under the age of 15 to cannabis, and the development of schizophrenia among individuals with an underlying genetic vulnerability for the disease. Another witness, Dr. Tony George, also pointed out that genetics plays a role in determining who is more susceptible to experiencing psychosis as a result of cannabis use, noting that individuals with the gene catechol-O-methyltransferase, which is present in approximately 36% of the general population, are 5 to 10 times more vulnerable to psychosis when using cannabis.<sup>62</sup>

Finally, the Committee heard that social stress and other environmental factors can also influence the functioning of the eCB system, which in turn impacts how the eCB system responds to cannabis use, particularly in individuals at risk for the development of schizophrenia.<sup>63</sup> Dr. Mizrahi therefore concluded that “cannabis use, genetic vulnerability, social stress and other social and environmental risk factors interact in a complex age-

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59 HESA, [Evidence](#), 2<sup>nd</sup> Session, 41<sup>st</sup> Parliament, 1 May 2014, 1000 (Professor Harold Kalant); HESA, [Evidence](#), 2<sup>nd</sup> Session, 41<sup>st</sup> Parliament, 6 May 2014, 0850 (Dr. Andra Smith and Michel Perron); HESA, [Evidence](#), 2<sup>nd</sup> Session, 41<sup>st</sup> Parliament, 6 May 2014, 0910 (Dr. Kevin Sabet).

60 HESA, [Evidence](#), 2<sup>nd</sup> Session of the 41<sup>st</sup> Parliament, 8 May 2014, 0910 (Dr. Romina Mizrahi, Assistant Professor of Psychiatry at the University of Toronto, as an Individual).

61 Ibid.

62 HESA, [Evidence](#), 2<sup>nd</sup> Session of the 41<sup>st</sup> Parliament, 8 May 2014, 0925 (Dr. Tony George, Professor of Psychiatry, University of Toronto, as an Individual).

63 HESA, [Evidence](#), 2<sup>nd</sup> Session of the 41<sup>st</sup> Parliament, 8 May 2014, 0910 (Dr. Romina Mizrahi).

dependent manner, leading to the observed epidemiological link between cannabis and schizophrenia.”<sup>64</sup> According to Dr. George, these research findings speak to the need for prevention efforts, including education and behavioural interventions targeted at individuals who are at particular risk for the development of psychosis or schizophrenia as a result of cannabis use.<sup>65</sup>

However, both Dr. Mizrahi and Dr. Walsh also pointed out that the relationship between cannabis and psychosis is not clear-cut because while the THC content of the plant is known to produce psychotic effects, its other components such as cannabigerol (CBG) and cannabidiol (CBD) have been reported to have an anti-psychotic effect.<sup>66</sup> Consequently, the risks for psychosis associated with cannabis use may also vary by the type of cannabis used, including the ratio of THC to CBG and CBD in the plant.<sup>67</sup>

## 2. Anxiety and Depression

Several witnesses appearing before the Committee explained that the evidence linking marijuana use to anxiety and depression is mixed.<sup>68</sup> The Committee heard that some studies have reported a higher prevalence of anxiety disorders among heavier cannabis users. In addition, some studies have shown that marijuana use can create the risk for the development of anxiety and mood disorders, as well as suicidal thoughts.<sup>69</sup> In addition, panic responses are the most common side effect of cannabis use, particularly among naïve users.<sup>70</sup> However, other studies have reported decreased depression and anxiety amongst cannabis users. Anxiety relief is reported as the primary motivation for cannabis use.<sup>71</sup>

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64 Ibid.

65 HESA, [Evidence](#), 2<sup>nd</sup> Session of the 41<sup>st</sup> Parliament, 8 May 2014, 0925 (Dr. Tony George).

66 HESA, [Evidence](#), 2<sup>nd</sup> Session of the 41<sup>st</sup> Parliament, 8 May 2014, 0915 (Dr. Romina Mizrahi); HESA, [Evidence](#), 2<sup>nd</sup> Session, 41<sup>st</sup> Parliament, 13 May 2014, 0850 (Dr. Zach Walsh).

67 HESA, [Evidence](#), 2<sup>nd</sup> Session, 41<sup>st</sup> Parliament, 13 May 2014, 0855 (Dr. Zach Walsh).

68 HESA, [Evidence](#), 2<sup>nd</sup> Session, 41<sup>st</sup> Parliament, 6 May 2014, 0900 (Michel Perron); HESA, [Evidence](#), 2<sup>nd</sup> Session, 41<sup>st</sup> Parliament, 13 May 2014, 0950 (Dr. Zach Walsh).

69 HESA, [Evidence](#), 2<sup>nd</sup> Session, 41<sup>st</sup> Parliament, 13 May 2014, 0855 (Dr. Zach Walsh); HESA, [Evidence](#), 2<sup>nd</sup> Session, 41<sup>st</sup> Parliament, 1 May 2014, 0950 (Dr. Meldon Kahan).

70 Ibid.

71 HESA, [Evidence](#), 2<sup>nd</sup> Session, 41<sup>st</sup> Parliament, 13 May 2014, 0855 (Dr. Zach Walsh).

### 3. Addiction

According to the Canadian Medical Association, addiction is a serious, relapsing chronic disease, and substance abuse is a complex behaviour influenced by many different factors.<sup>72</sup> One of these factors is the clear addictive properties of cannabis itself.<sup>73</sup> The Committee heard that between 7% and 10% of cannabis users meet the criteria for dependence, which consist of developing a tolerance for the drug; experiencing difficulties on withdrawal; having a persistent desire to cut down or control consumption; spending time obtaining, using and recovering from the effects of the drug; giving up important social, occupational and recreational activities because of drug use; and continuing use despite knowledge of the drug's harmful effects.<sup>74</sup>

According to Dr. Bernard Le Foll, though the percentage of individuals who develop marijuana dependence is relatively low, the percentage of individuals who experience problematic use of the substance during the course of their lifetime is high at 40%.<sup>75</sup> These individuals will experience difficulties in controlling their use of marijuana, but this problem is generally transitory and does not require treatment to be cured.

In addition, the Committee heard that certain population groups are more at risk for developing a cannabis-use disorder. The Committee heard that while the risk of addiction among individuals who regularly use marijuana in the general population is 10%, this figure increases to 16% among adolescents who regularly use the drug.<sup>76</sup> Dr. Le Foll explained to the Committee that there is clear evidence that the younger the initiation of use, the higher the risk of dependence.<sup>77</sup> This risk is highest for individuals who initiate use before the age of 14 and gradually decrease use until the age of 18. Risk of dependence remains lowest if the initiation of cannabis begins after the age of 18.

Furthermore, the Committee heard that individuals with mental illnesses experience high co-morbidity rates of cannabis dependence.<sup>78</sup> It is estimated that persons with a mental illness consume roughly 80% of all cannabis consumed in the United States.<sup>79</sup> The co-morbidity of these two conditions may be attributed to the fact that individuals with mental illness may be more vulnerable to developing an addiction, or they may self-medicate for their disorder. Alternatively, the drug could be creating the psychiatric

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72 Canadian Medical Association, "The Health Risks and Harms Associated with the Use of Marijuana," submitted to the Committee on 27 May 2014.

73 HESA, [Evidence](#), 2<sup>nd</sup> Session of the 41<sup>st</sup> Parliament, 8 May 2014, 0850 (Dr. Bernard Le Foll).

74 HESA, [Evidence](#), 2<sup>nd</sup> Session of the 41<sup>st</sup> Parliament, 8 May 2014, 0855 (Dr. Bernard Le Foll); HESA, [Evidence](#), 2<sup>nd</sup> Session, 41<sup>st</sup> Parliament, 1 May 2014, 0950 (Dr. Meldon Kahan).

75 HESA, [Evidence](#), 2<sup>nd</sup> Session of the 41<sup>st</sup> Parliament, 8 May 2014, 0900 (Dr. Bernard Le Foll);

76 HESA, [Evidence](#), 2<sup>nd</sup> Session, 41<sup>st</sup> Parliament, 1 May 2014, 1005 (Professor Harold Kalant).

77 HESA, [Evidence](#), 2<sup>nd</sup> Session of the 41<sup>st</sup> Parliament, 8 May 2014, 0900 (Dr. Bernard Le Foll).

78 Ibid, 0905.

79 Ibid.

condition, though evidence is not conclusive in this area. The Committee heard that individuals with mental illnesses, particularly those with schizophrenia, who are heavy, persistent users of cannabis, will also experience further impairment of their cognitive functioning.<sup>80</sup>

Finally, with respect to whether cannabis use during adolescence results in the increased use of other addictive substances later in life, a phenomenon known as the “gateway hypothesis”, the Committee heard that epidemiological data have shown that a small minority of cannabis users will go on to use harder substances such as heroin (1%) and cocaine (4%).<sup>81</sup> One witness explained that this could be attributed to the neurobiological effect of early cannabis exposure.<sup>82</sup> However, other witnesses suggested that other factors also play a role in exposing users to harder substances. For example, the illegal status of cannabis means that users must purchase cannabis on the black market where they can be offered other harder substances.<sup>83</sup> Poverty can also play a role.

### C. Respiratory Effects

Witnesses explained to the Committee that there are risks to a person’s respiratory system as a result of smoking marijuana. Smoking marijuana results in the inhalation of carcinogens and carbon monoxide, which creates health risks similar or possibly greater than those that arise from smoking tobacco. The Committee heard that research shows that marijuana smoke is an irritant to the lungs, increasing the prevalence of bronchitis, cough and phlegm production.<sup>84</sup> According to Dr. Kevin Sabet, marijuana smoke also contains between 50% and 70% more carcinogens than tobacco smoke.<sup>85</sup> In addition, marijuana smoke is unfiltered and users take larger and deeper puffs, keeping the smoke in the lungs longer, which may result in earlier onset of negative respiratory effects.<sup>86</sup>

However, the Committee heard that research evaluating the long-term effects of marijuana toxicity on the lungs remains limited because marijuana is often smoked in combination with tobacco, making a cause-effect relationship difficult to establish.<sup>87</sup> With respect to lung cancer, Dr. Kahan pointed to a long-term 40-year cohort study, published in 2013, of 50,000 males that found that regular cannabis smoking was

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80 HESA, [Evidence](#), 2<sup>nd</sup> Session of the 41<sup>st</sup> Parliament, 8 May 2014, 0920 (Dr. Tony George).

81 HESA, [Evidence](#), 2<sup>nd</sup> Session, 41<sup>st</sup> Parliament, 27 May 2014, 1020 (Dr. Didier Jutras-Aswad, Assistant Clinical Professor, Psychiatric Department, Université de Montréal, as an Individual); HESA, [Evidence](#), 2<sup>nd</sup> Session, 41<sup>st</sup> Parliament, 13 May 2014, 0845 (Philippe Lucas).

82 HESA, [Evidence](#), 2<sup>nd</sup> Session, 41<sup>st</sup> Parliament, 27 May 2014, 1020 (Dr. Didier Jutras-Aswad).

83 HESA, [Evidence](#), 2<sup>nd</sup> Session, 41<sup>st</sup> Parliament, 13 May 2014, 0855 (Philippe Lucas).

84 HESA, [Evidence](#), 2<sup>nd</sup> Session, 41<sup>st</sup> Parliament, 6 May 2014, 0850 (Kevin Sabet, PhD).

85 Ibid. 0935

86 Ibid. Canadian Centre on Substance Abuse, “Clearing the Smoke on Cannabis Series: Highlights,” April 2013, submitted to the HESA on 6 May 2014.

87 HESA, [Evidence](#), 2<sup>nd</sup> Session of the 41<sup>st</sup> Parliament, 8 May 2014, 0855 (Dr. Bernard Le Foll).

associated with a two-fold increase in the risk of developing lung cancer, after controlling for cigarette smoking and other risk factors.<sup>88</sup> Yet other witnesses indicated that the research in this area is unclear and more studies are necessary.<sup>89</sup>

#### **D. Cardiovascular Risks**

Witnesses also spoke of the cardiovascular risks associated with smoking marijuana. According to Dr. Kahan, cannabis smoking causes acute physiological effects including elevations in blood pressure and heart rate, and blood vessel constriction.<sup>90</sup> In addition, he noted that there have been case reports of young people suffering heart attacks and strokes shortly after smoking cannabis.

#### **E. Cannabis Use and Motor Vehicle Accidents**

The Committee learned from witnesses that research has shown that cannabis, when consumed in sufficient quantities, impairs the cognitive and psychomotor skills required for the safe driving of motor vehicles.<sup>91</sup> Studies have shown that vehicle tracking, reaction time and attention are impaired when cannabis is consumed.<sup>92</sup> Mr. Mark Asbridge explained that the impact of cannabis use on driving impairment is greatest between one to two hours after acute use. The Committee heard that meta-analytical studies have shown that driving within one to two hours of acute cannabis use increases the risk of car crashes two-fold. In particular, cannabis use during this period is associated with more severe crashes involving injury and death.

Mr. Asbridge explained that these findings are relevant given that surveys conducted in Canada, Australia and the United States have found that self-reported rates of driving under the influence of cannabis now surpass self-reported rates of drinking and driving.<sup>93</sup> Furthermore, 1 in 10 adults and 4 in 10 youths have reported driving under the influence of cannabis within one to two hours after use, the period when THC in cannabis is likely to impair driving performance.<sup>94</sup> In addition, the Committee heard from an Inspector from the RCMP that a 2011 report by the CCSA found that one-third of fatally injured drivers in Canada from 2000 to 2008 were drug-impaired and the most common drugs found in their system were Central Nervous System depressants, cannabis and

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88 HESA, [Evidence](#), 2<sup>nd</sup> Session, 41<sup>st</sup> Parliament, 1 May 2014, 0950 (Dr. Meldon Kahan).

89 HESA, [Evidence](#), 2<sup>nd</sup> Session, 41<sup>st</sup> Parliament, 6 May 2014, 0905 (Michel Perron) and 0935 (Dr. Kevin Sabet).

90 HESA, [Evidence](#), 2<sup>nd</sup> Session, 41<sup>st</sup> Parliament, 1 May 2014, 0950 (Dr. Meldon Kahan).

91 HESA, [Evidence](#), 2<sup>nd</sup> Session, 41<sup>st</sup> Parliament, 27 May 2014, 0930 (Mark Asbridge, Associate Professor, Dalhousie University, as an Individual).

92 Ibid.

93 Ibid.

94 Ibid.

stimulants.<sup>95</sup> Furthermore, the group most at risk for fatal motor vehicle accidents was drivers aged 16 to 24 and the drug of choice was cannabis.<sup>96</sup> The Committee also heard that many of the traffic fatalities related to drug use included multi-drug use and/or the use of cannabis in combination with alcohol.<sup>97</sup>

However, Mr. Asbridge indicated that there are ongoing policy and research debates on the relationship between cannabis use and the risk of motor vehicle accidents.<sup>98</sup> He explained that while there appears to be a dose-response relationship between THC levels measured in the blood and the risk of a motor vehicle accident, there are debates on what levels of THC in the body can be considered legal impairment, because impairment is influenced by the exact timing of marijuana consumption in relation to the driving event. A representative of the RCMP further explained that THC levels in the blood will fall from 50 or 25 nanograms per millilitre to below 2.5 per milliliters within 160 minutes of cannabis use in approximately 90% of the population. Meanwhile, heavy users will have residual levels of 2.5 nanograms per millilitre as a result of past use.<sup>99</sup> In addition, Mr. Asbridge noted that there are ethical challenges associated with conducting research assessing the extent to which cannabis contributes to the risk of a motor vehicle accident because it also requires measuring the levels of marijuana use in drivers not involved in crashes through blood tests.<sup>100</sup>

## **The Federal Role in Addressing the Health Risks and Harms of Marijuana Use**

Officials from Health Canada appearing before the Committee outlined the federal government's role in addressing the health risks and harms associated with marijuana use, including the regulation of recreational and medical use of marijuana under the *Controlled Drugs and Substances Act* (CDSA), and prevention approaches that focus on increasing knowledge and raising public awareness. Other witnesses presented ways in which the federal government could further its efforts in this area. This testimony is presented in the sections below.

### **A. Marijuana Use and the *Controlled Drugs and Substances Act***

According to a Health Canada official appearing before the Committee, the CDSA is Canada's federal drug control statute, which provides a legislative basis for the control of substances that can alter mental processes and may cause harm to the health of an

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95 HESA, [Evidence](#), 2<sup>nd</sup> Session, 41<sup>st</sup> Parliament, 27 May 2014, 0845 (Inspector Jamie Taplin, Royal Canadian Mounted Police (RCMP))

96 Ibid

97 Ibid. 0850.

98 Ibid. 0845 (Mark Asbridge).

99 Ibid. 0910 (Darcy Smith, General Manager, National Forensic Services, RCMP).

100 Ibid.0935 (Mark Asbridge).



individual or society when abused or diverted into the illicit market.<sup>101</sup> The Act sets out offences in the form of direct prohibitions of many activities involving controlled substances, including production, possession, distribution, import or export of these substances. However, it does contain provisions that allow for access to these substances for legitimate medical, industrial or scientific purposes, while subjecting them to tight controls. As such, the Act has a dual purpose to protect public health and maintain public safety.<sup>102</sup>

Substances controlled under the CDSA are grouped into six different schedules.<sup>103</sup> In determining whether a substance should be added to one of the schedules to the Act, Health Canada examines the following six factors: international requirements and trends related to scheduling; chemical and pharmacological similarity to other substances listed under the Act; addiction liability and potential for abuse; evidence of actual abuse in Canada and internationally; risk to personal and public health and safety; and its legitimate therapeutic, scientific, industrial or commercial uses.<sup>104</sup> *C. sativa*, its derivatives, preparations and similar synthetic preparations are listed under Schedule II of the CDSA, making its recreational use illegal in Canada. The official further explained that Canada's regulation of marijuana as a controlled substance is in line with legislation in most other countries and its international obligations under three United Nations drug conventions. Moreover, the official noted that marijuana has been regulated as a controlled substance in Canada since 1923.

Witnesses such as Dr. Kahan, Professor Kalant and Dr. Sabet do not support the legalization of marijuana because it would increase the health risks and harms associated with its use.<sup>105</sup> They suggested that the legalization of marijuana would increase its availability and lower its price, which would make its use more widespread. More widespread use in turn would increase the number of people experiencing negative health consequences of its use. For these witnesses, the legalization of tobacco and alcohol represent a case against the legalization of marijuana, as the higher health-related costs associated with use and abuse of these substances can be attributed to their widespread use within the general population.<sup>106</sup> Furthermore, the legal status of alcohol and tobacco does not prevent youth from gaining access to it, nor does it eliminate the black market for tobacco, where content remains unregulated.

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101 HESA, [Evidence](#), 2<sup>nd</sup> Session, 41<sup>st</sup> Parliament, 1 May 2014, 0845 (Hilary Geller).

102 Ibid.

103 Ibid.

104 Ibid.

105 HESA, [Evidence](#), 2<sup>nd</sup> Session, 41<sup>st</sup> Parliament, 1 May 2014, 1030 (Dr. Meldon Kahan) and 1025 (Professor Harold Kalant); HESA, [Evidence](#), 2<sup>nd</sup> Session, 41<sup>st</sup> Parliament, 6 May 2014, 0940 (Dr. Kevin Sabet).

106 Ibid.

Dr. Sabet explained that experiences of legalization in other jurisdictions support this argument. For example, he pointed out that legalization of marijuana use in the City of Denver, Colorado in 2005 resulted in an increase in the rate of marijuana use, which is also higher than the average rate of use in areas of the United States where recreational marijuana use is prohibited.<sup>107</sup> Dr. Sabet's presentation showed that past-month use in Denver increased from 9.6% in 2006–2008 to 12.2% in 2008–2010.<sup>108</sup> Meanwhile, past-month prevalence of marijuana use in the United States as a whole increased from 6% to 6.6% during the same period. Dr. Sabet explained that increased availability of marijuana in Colorado has resulted in unintentional toxic ingestions of marijuana by children, which resulted in admissions to the Children's Hospital in Colorado.<sup>109</sup> His presentation also showed that between 2007 and 2011, there was an increase in the number of fatal car crashes, from 23 to 53, involving drivers testing positive for marijuana.<sup>110</sup>

Dr. Kendall's written submission to the Committee indicated that data from a World Health Organization survey showed that globally, drug use was not related to drug policy, as countries with stringent user-level illegal drug policies do not have lower levels of use than those with more liberal policies.<sup>111</sup> Dr. Evan Wood also pointed out that the illegal status of marijuana does not prevent youth from gaining access to the substance, as 80% of young people surveyed in the U.S. Monitoring of the Future Study suggested that cannabis is easy to obtain.<sup>112</sup> Professor Kalant also commented that:

...the use of cannabis for pleasure comes at a cost, and society must ponder whether the pleasure is worth the cost...society as a whole must give careful thought to changes in policy that could increase the number and severity of health problems caused by use by its more vulnerable members, which, as I have pointed out, means its younger users.<sup>113</sup>

Finally, Dr. Didier Jutras-Aswad suggested that the scheduling of cannabis under the CDSA should be reviewed to take into account the different contents of the plant, as cannabis strains that contain high levels of cannabinoids such as CBD and low levels of

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107 HESA, [Evidence](#), 2<sup>nd</sup> Session, 41<sup>st</sup> Parliament, 6 May 2014, 1030 (Dr. Kevin Sabet) and Kevin A. Sabet, Ph.D., "Reefer Sanity: Seven Great Myths About Marijuana," presentation submitted to the Committee on 6 May 2014.

108 Kevin A. Sabet, Ph.D., "Reefer Sanity: Seven Great Myths About Marijuana," presentation submitted to the Committee on 6 May 2014.

109 HESA, [Evidence](#), 2<sup>nd</sup> Session, 41<sup>st</sup> Parliament, 6 May 2014, 0940 (Dr. Kevin Sabet).

110 Kevin A. Sabet, Ph.D., "Reefer Sanity: Seven Great Myths About Marijuana," presentation submitted to the Committee on 6 May 2014.

111 Dr. Perry Kendall, "Cannabis Related Benefits and Harms: Information to Assist in Decision Making about Cannabis Policy," submitted to the Committee on 21 May 2014.

112 HESA, [Evidence](#), 2<sup>nd</sup> Session, 41<sup>st</sup> Parliament, 27 May 2014, 0845 (Dr. Evan Wood, Director of the British Columbia Centre for Excellence in HIV/AIDS, Urban Health Research, as an Individual).

113 HESA, [Evidence](#), 2<sup>nd</sup> Session, 41<sup>st</sup> Parliament, 1 May 2014, 1005 (Professor Harold Kalant).

THC are much safer and less addictive than those with high levels of THC and low levels of CBD.<sup>114</sup>

## B. Marijuana Use for Medical Purposes

Under section 55(1) of the CDSA, the federal government grants access to marijuana for medical purposes to individuals who have the support of a health care provider through the *Marihuana for Medical Purposes Regulations* (MMPR), making it one of four countries to have a form of a medical marijuana regime.<sup>115</sup> Hilary Geller, Assistant Deputy Minister at Health Canada, explained to the Committee that the federal government enabled reasonable access to marijuana for medical purposes in response to a decision made by the courts. She further articulated that dried marijuana is not an approved drug or medicine in Canada and the department does not endorse its use.<sup>116</sup> She explained that, "...dried marijuana has not gone through the clinical trials, etc., and the rigorous process that is required for any other prescription medication in this country."<sup>117</sup> Finally, she noted that the MMPR are new regulations introduced in June 2013.

The Committee also learned from officials that there are two prescription drugs which contain cannabinoids that have been approved for medical use by Health Canada under the *Food and Drugs Act*: Sativex and Cesamet.<sup>118</sup> Sativex contains both THC and cannabidiol and is indicated as an adjunctive treatment for the relief of neuropathic pain for adults with multiple sclerosis. Meanwhile, Cesamet contains a synthetic cannabinoid and is used in the management of nausea and vomiting in patients undergoing chemotherapy.<sup>119</sup>

As a result of the limited scientific evidence demonstrating the safety and effectiveness of smoked marijuana, physicians appearing before the Committee indicated that they did not support the use of dried, smoked marijuana for the treatment of medical conditions.<sup>120</sup> In particular, the Federation of Medical Regulatory Authorities indicated that it has remained opposed to the medical marijuana regime in Canada for the past 10 years because of the lack of clinical evidence in this area which, in their view, puts patients at

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114 HESA, [Evidence](#), 2<sup>nd</sup> Session, 41<sup>st</sup> Parliament, 27 May 2014, 0945 (Dr. Didier Jutras-Aswad).

115 HESA, [Evidence](#), 2<sup>nd</sup> Session, 41<sup>st</sup> Parliament, 1 May 2014, 0845 (Hilary Geller).

116 Ibid.

117 Ibid., 0910.

118 Ibid.

119 HESA, [Evidence](#), 2<sup>nd</sup> Session, 41<sup>st</sup> Parliament, 1 May 2014, 0915 (Robert Ianaro, Director General Controlled Substances and Tobacco Directorate, Healthy Environments and Consumer Safety Branch, Health Canada).

120 HESA, [Evidence](#), 2<sup>nd</sup> Session, 41<sup>st</sup> Parliament, 1 May 2014, 0955 (Dr. Meldon Kahan); HESA, [Evidence](#), 2<sup>nd</sup> Session, 41<sup>st</sup> Parliament, 8 May 2014, 0850 (Dr. Trevor Theman, President Elect, Federation of Medical Regulatory Authorities of Canada).

risk.<sup>121</sup> The organization also explained that it does not support the new regulations introduced in June 2013, as they diminish the role of the physician in the scheme from attesting to the medical condition of patients to that of a signing authority for authorizing the use of medical marijuana by their patients.

Producers who have been licensed by Health Canada under the MMPR have also presented their reservations about some of the health risks associated with smoking marijuana, including Canmart which, in its written submission to the Committee, stated, “While people across the country have varying opinions on the use of marijuana, the scientific evidence is clear that the use of THC by some youth with predisposition for schizophrenia and related disorders is detrimental to their health.”<sup>122</sup>

To address these concerns about the safety and efficacy of medical marijuana use, witnesses recommended that evidence-based clinical guidelines for the medical use of marijuana be developed to help physicians make sound prescribing decisions.<sup>123</sup> In addition, Dr. Kahan also recommended that dosing limits be established under the new medical marijuana regulations.<sup>124</sup> He explained that distributors are currently selling cannabis strains with up to 30% THC content and under the new regulations, physicians are able to prescribe up to five grams of marijuana per day. From his perspective, these THC concentrations coupled with the dosage are excessive and pose a danger to patients. Instead, he recommended that the dose be limited to no more than 400 milligrams per day of cannabis with 9% THC content. Finally, the Committee heard from witnesses who suggested that there is a need for the federal government to provide support for research examining the safety and effectiveness of the medical use of marijuana, including a post-market surveillance program to evaluate the health outcomes of medical marijuana users in Canada.<sup>125</sup>

### C. Prevention Through Knowledge and Public Awareness

The Committee heard that the federal government is addressing the health risks and harms associated with marijuana use by increasing knowledge and public awareness in this area. A Health Canada official explained that through the NADS, the Minister of Health is providing \$11.5 million over five years to the CCSA to reduce drug use among youth, including support for research examining the impact of marijuana use on brain

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121 HESA, [Evidence](#), 2<sup>nd</sup> Session of the 41<sup>st</sup> Parliament, 8 May 2014, 0850 (Dr. Trevor Theman).

122 Umar Syed, President, Canmart, “Submission of Position on Cannabis Policy,” submitted to the Committee 27 May 2014.

123 HESA, [Evidence](#), 2<sup>nd</sup> Session, 41<sup>st</sup> Parliament, 1 May 2014, 0955 (Dr. Meldon Kahan); HESA, [Evidence](#), 2<sup>nd</sup> Session of the 41<sup>st</sup> Parliament, 8 May 2014, 0850 (Dr. Trevor Theman).

124 HESA, [Evidence](#), 2<sup>nd</sup> Session, 41<sup>st</sup> Parliament, 1 May 2014, 0955 (Dr. Meldon Kahan).

125 HESA, [Evidence](#), 2<sup>nd</sup> Session of the 41<sup>st</sup> Parliament, 8 May 2014, 0850 (Dr. Trevor Theman); HESA, [Evidence](#), 2<sup>nd</sup> Session, 41<sup>st</sup> Parliament, 13 May 2014, 0915 (Philippe Lucas); HESA, [Evidence](#), 2<sup>nd</sup> Session, 41<sup>st</sup> Parliament, 27 May 2014, 1020 (Dr. Didier Jutras-Aswad).

development and impaired driving.<sup>126</sup> The official further noted that the Minister is also engaging key stakeholders and experts to discuss scientific evidence related to the health effects of marijuana use by youth and identify strategies for raising awareness of the risks of marijuana use. The Committee also heard that strategies from successful public awareness campaigns targeted at reducing the use of hard street drugs could be used to inform new efforts to develop awareness campaigns for marijuana use.

A representative from the RCMP explained that the organization has developed a strategy to help change public attitudes about impaired driving, which focuses in part on education and raising awareness about drug-impaired driving.<sup>127</sup> Activities under this strategy include engaging youth in discussions on both drug- and alcohol-impaired driving; coordinating national enforcement days against impaired driving; and supporting training and equipment to support drug-impaired driving investigations. Through NADS, the RCMP also engages in public outreach in relation to illegal marijuana use through public awareness programs such as Drug Abuse Resistance Education, the Aboriginal Shield Program, Racing Against Drugs, Kids and Drugs and Drug Endangered Children.

Witnesses appearing before the Committee highlighted the importance of raising awareness of the potential health risks and harms of marijuana use as a key means of reducing the rate of marijuana use, as well as cannabis-impaired driving in Canada. As Dr. George explained, the Monitoring of the Future Study in the United States found that if the perception of harm among youth is increased, the rate of cannabis use decreases.<sup>128</sup> The Committee heard that public awareness campaigns addressed towards youth need to focus on accurate information on the health risks and harms of marijuana use to empower youth to make informed decisions about their well-being and future, rather than using scare tactics which have been shown to be less effective.<sup>129</sup> Witnesses also indicated that physicians, nurse practitioners and other primary care providers had a key role to play in raising awareness, as evidence suggests that adolescents are open to advice from their physician on substance abuse.<sup>130</sup>

Finally, witnesses also noted that addressing substance abuse is a complex task that requires a multifactorial strategy that focuses on preventing drug abuse and

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126 HESA, [Evidence](#), 2<sup>nd</sup> Session, 41<sup>st</sup> Parliament, 1 May 2014, 0855 (Hilary Geller).

127 HESA, [Evidence](#), 2<sup>nd</sup> Session, 41<sup>st</sup> Parliament, 27 May 2014, 0850 (Inspector J.R. Taplin).

128 HESA, [Evidence](#), 2<sup>nd</sup> Session, 41<sup>st</sup> Parliament, 8 May 2014, 0925 (Dr. Tony George).

129 HESA, [Evidence](#), 2<sup>nd</sup> Session, 41<sup>st</sup> Parliament, 6 May 2014, 0905 (Michel Perron).

130 Canadian Medical Association, "The Health Risks and Harms Associated with the Use of Marijuana," submitted to the Committee on 27 May 2014; HESA, [Evidence](#), 2<sup>nd</sup> Session, 41<sup>st</sup> Parliament, 1 May 2014, 1000 (Dr. Meldon Kahan).

dependence; increasing the availability of assessment, counselling and treatment services for individuals; and reducing the risks and harms of substance abuse.<sup>131</sup>

### **Committee Observations and Recommendations**

The Committee's study focused on examining scientific evidence related to the health risks and harms associated with marijuana use. In particular, the Committee was interested in learning about the impact of marijuana use on the developing brain of youth and the drug's potential for addiction. Witnesses appearing before the Committee explained that current and emerging scientific evidence is demonstrating that youth are particularly at risk for the health risks and harms of marijuana use linked to impairment resulting from both acute and chronic use. The Committee also heard that prenatal exposure to marijuana can cause subtle mental effects in children beginning at three years of age, which are significant enough to affect educational attainment. Youth are also more vulnerable to addiction to cannabis than are adults: addiction rates for regular users in the general population are 10%, whereas for youth, they increase to 16%. For both youth and adults with a genetic pre-disposition to schizophrenia, cannabis, in addition to other genetic, environmental and social factors, is considered a possible contributor to the development of the disease. In addition to the known cognitive impairment associated with acute use, the study also revealed that chronic cannabis use may also result in respiratory effects, cardiovascular risks, anxiety and depression in some members of the population. Finally, the Committee heard that cannabis use increases the risk for a motor vehicle accident two-fold, if consumed one to two hours before driving.

Despite these health risks and harms associated with use, the Committee heard that Canadians, and, in particular, youth, see cannabis as a benign substance and are confused about its health impacts. Moreover, witnesses explained that this perception contributes to the high rates of use among youth at 20.3% and among the general population at 10.2%. For witnesses, this trend was all the more worrying, given evidence suggesting that the potency of marijuana has increased substantially from 1% THC content in the 1980s to approximately 10% to 11% today. Given the gap between the current and emerging scientific evidence related to the impact of marijuana use on youth, witnesses highlighted the need for increased public awareness of its health risks and harms so youth and their parents could make informed choices.

The Committee therefore recommends that:

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131 HESA, [Evidence](#), 2<sup>nd</sup> Session, 41<sup>st</sup> Parliament, 6 May 2014, 0905 (Michel Perron); Canadian Medical Association, "The Health Risks and Harms Associated with the Use of Marijuana," submitted to the Committee on 27 May 2014.

## RECOMMENDATION 1

The Government of Canada work with relevant stakeholders and experts to develop a campaign to raise public awareness and knowledge of the risks and harms associated with marijuana use.

## RECOMMENDATION 2

The Government of Canada work with health professional organizations to increase their awareness of the scientific evidence related to the health risks and harms of marijuana use and promote the development and dissemination of tools to support these organizations' efforts to prevent, manage and treat drug abuse.

## RECOMMENDATION 3

The Government of Canada continue to support, in collaboration with the provinces and territories and key stakeholders, strategies for the prevention of drug-impaired driving through the RCMP Impaired Driving Strategy

## RECOMMENDATION 4

The Government of Canada continue to fund research aimed at improving the understanding of the short- and long-term harms related to marijuana use, and, in particular, its relationship to the development of addiction in vulnerable population groups, such as youth and individuals with mental illnesses.

The Committee's study also revealed that some physicians appearing before the Committee do not support the medical use of dried marijuana as allowed for under the federal *Marihuana for Medical Purposes Regulations*. To facilitate access to medical marijuana in Canada, as mandated by court rulings, the Committee was told that there is a need for evidence-based clinical guidelines for marijuana use; more research into its clinical effectiveness; post-market surveillance of patient outcomes; and monitoring of physician prescribing behaviour.<sup>132</sup>

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132 HESA, [Evidence](#), 2<sup>nd</sup> Session, 41<sup>st</sup> Parliament, 8 May 2014, 0850 (Dr. Trevor Theman).





# LIST OF RECOMMENDATIONS

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## Recommendation 1

The Government of Canada work with relevant stakeholders and experts to develop a campaign to raise public awareness and knowledge of the risks and harms associated with marijuana use. .... 21

## Recommendation 2

The Government of Canada work with health professional organizations to increase their awareness of the scientific evidence related to the health risks and harms of marijuana use and promote the development and dissemination of tools to support these organizations' efforts to prevent, manage and treat drug abuse. .... 21

## Recommendation 3

The Government of Canada continue to support, in collaboration with the provinces and territories and key stakeholders, strategies for the prevention of drug-impaired driving through the RCMP Impaired Driving Strategy ..... 21

## Recommendation 4

The Government of Canada continue to fund research aimed at improving the understanding of the short- and long-term harms related to marijuana use, and, in particular, its relationship to the development of addiction in vulnerable population groups, such as youth and individuals with mental illnesses. .... 21



# APPENDIX A LIST OF WITNESSES

Organizations and Individuals	Date	Meeting
<p><b>As an individual</b></p> <p>Meldon Kahan, Medical Director, Women's College Hospital</p> <p>Harold Kalant, University of Toronto</p> <p><b>Department of Health</b></p> <p>Hanan Abramovici, Senior Scientific Information Officer, Office of Research and Surveillance</p> <p>Hilary Geller, Assistant Deputy Minister, Healthy Environments and Consumer Safety Branch</p> <p>Robert Ianiro, Director General, Controlled Substances and Tobacco Directorate, Healthy Environments and Consumer Safety Branch</p> <p>Cindy Moriarty, Executive Director, Health Programs and Strategic Initiatives / Strategic Policy Branch</p>	2014/05/01	24
<p><b>Canadian Centre on Substance Abuse</b></p> <p>Michel Perron, Chief Executive Officer</p> <p>Amy Porath-Waller, Senior Research and Policy Analyst</p> <p><b>Smart Approaches to Marijuana</b></p> <p>Kevin Sabet, Executive Director</p> <p><b>University of Ottawa</b></p> <p>Andra Smith, Associate Professor</p>	2014/05/06	25
<p><b>As an individual</b></p> <p>Tony P. George, Professor of Psychiatry, University of Toronto</p> <p>Bernard Le Foll, Professor, University of Toronto</p> <p>Romina Mizrahi, Assistant Professor of Psychiatry, University of Toronto</p> <p><b>Federation of Medical Regulatory Authorities of Canada</b></p> <p>Fleur-Ange Lefebvre, Executive Director and Chief Executive Officer</p> <p>Trevor Theman, President-Elect</p>	2014/05/08	26

Organizations and Individuals	Date	Meeting
<p><b>As an individual</b></p> <p>Philippe Lucas, Doctoral Candidate, University of Victoria</p> <p>Zach Walsh, Associate Professor, University of British Columbia</p>	2014/05/13	27
<p><b>As an individual</b></p> <p>Mark Asbridge, Associate Professor, Dalhousie University</p> <p>Didier Jutras-Aswad, Assistant Clinical Professor, Psychiatric Department, Université de Montréal</p> <p>Evan Wood, Director, B.C. Centre for Excellence in HIV/AIDS, Urban Health Research Initiative</p> <p><b>Royal Canadian Mounted Police</b></p> <p>Dustin Rusk, Public Engagement Officer, Federal Policing Public Engagement Program</p> <p>Darcy Smith, General Manager, National Forensic Services</p> <p>Jamie Taplin, Officer in Charge, Policy and Compliance, National Criminal Operations, Contract and Aboriginal Policing</p>	2014/05/27	29

# **APPENDIX B LIST OF BRIEFS**

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## **Organizations and Individuals**

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**British Columbia Ministry of Health**

**Canadian Medical Association**

**Cannmart**

**Drug Prevention Network of Canada**

**Smart Approaches to Marijuana**



# REQUEST FOR GOVERNMENT RESPONSE

Pursuant to Standing Order 109, the Committee requests that the government table a comprehensive response to this Report.

A copy of the relevant *Minutes of Proceedings* ([Meetings Nos. 24, 25, 26, 27, 29, 35 and 36](#)) is tabled.

Respectfully submitted,

Ben Lobb

Chair





**Federal New Democrats issue this dissenting minority report in response to the HESA Committee report on the risks and harms of marijuana.**

While it is timely to study and review all aspects of marijuana policy and use in Canada, the current study was unbalanced and was designed to focus on the harms of marijuana policy and use in Canada. The study and resulting report did not allow for an unbiased assessment of both harms and potential medical benefits.

Significant testimony was dismissed and eliminated by government members, because it did not support their pre-conceived views about marijuana. Moreover, the report contains “opinions” that are not evidence-based, that are included for political reasons.

A broad consensus must be sought on this issue by involving Canadians from all walks of life, including but not limited to: public safety professionals, educators, health care providers, academics, legal experts, community leaders and youth representatives. Unfortunately, the study heard from an over representation of witnesses focused on the harm and risks of marijuana.

It is clear that the Conservative war on drugs is not working. We need an approach that focuses on health promotion, public education, and safety. Based on a more balanced approach, we urge the government of Canada to:

**1) Pursue a public health approach to marijuana focused on education, and where necessary, treatment and harm reduction.**

New Democrats acknowledge that there are issues of harm and risk pertaining to marijuana use, particularly for youth. These include concerns that marijuana can increase the risk of accidents while driving, and research suggesting complications related to schizophrenia.

But as noted by Dr. Evan Wood, Dr. Tony George, the Canadian Public Health Association, Philippe Lucas, and others, a public health approach to the non-medical use of drugs, is necessary and critical to minimize risks and harms. The Committee heard that public awareness campaigns aimed at youth need to focus on accurate information on

health risks and overall health and well-being, rather than using "zero tolerance" and negative messaging that is not effective, particularly for youth.

**2) Fund research to examine the potential effectiveness of medical marijuana.**

Approximately 50% of people who use medical marijuana do so to relieve chronic pain, according to witness Dr Perry Kendall. Anxiety relief is reported as the primary motivation for cannabis use. In addition, cannabis has also been noted for its effectiveness in relieving anxiety that is secondary to other medical conditions such as chronic pain, HIV/AIDS and Multiple Sclerosis. Finally, the Committee heard that as a result of its potential anti-anxiety properties cannabis is under research for the treatment of Post-Traumatic Stress Disorder (PTSD). Veterans Affairs Canada also pays for the cost of medical marijuana for the treatment of PTSD in veterans.

But research on medical marijuana is limited because of prohibition. More in-depth research to examine the potential benefits of medical marijuana is needed, but is difficult to undertake due to current Canadian government policies on marijuana. The government of Canada needs to fund research on the clinical effectiveness of marijuana; as well as the long term effects on vulnerable populations, such as youth and mental illness.

**3) Establish an independent commission with a broad mandate, including safety and public health, to consult Canadians on all aspects of the non-medical use of marijuana and to provide guidance to Parliament on the institution of an appropriate regulatory regime to govern such use.**

The current unregulated market has failed and produced violence, stigma, and control by organized crime. Criminalization is not the answer. Our marijuana laws need to be modernized and based on evidence and public health principles. The government's approach must seek to balance prevention, public health and well-being, harm reduction, community safety and public education. The federal government must also consult and work with provincial, territorial, municipal and First Nations, Inuit and Métis governments.

In summary: New Democrats express extreme disappointment that this study was so one sided. As a result it serves no useful purpose, other than to bolster already held Conservative political opinions that are not based on evidence.



**Dissenting Report by the Liberal Party of Canada on the Health Committee's  
Report: "Health Risks and Harms of Marijuana"**

By Hon. Dr. Hedy Fry, P.C., M.P. for Vancouver Centre  
and Liberal Party of Canada Health Critic

In April 2014 the House of Commons Standing Committee on Health passed a motion to undertake a study, of no more than 5 meetings, examining the scientific evidence related to the health risks and harms associated with the use of marijuana.

The Liberal Party of Canada rejects the majority report from that study and presents a Dissenting Report for the following reasons:

- The final report does not reflect the testimony and advice that we heard from the expert witnesses who presented to Committee. Much of the testimony we heard during the study, specifically around scientific evidence, is absent from the report.
- We consider the study to be inherently flawed. Liberals had asked for the study to include benefits as well as harms and risks. This is the objective, scientific manner, in which all drugs are assessed, and despite recommendations by many witnesses, it was not included as part of the study.

**This is what the Committee heard:**

Marijuana is a hemp plant, *Cannabis Sativa* and contains 489 distinct compounds. Delta 9 THC Tetrahydrocannabinol is responsible for most of the euphoric and addictive effects of cannabis, since it stimulates the endocannabinoid (eCB) receptors of the brain which produce psychotropic and neural developmental effects. Other cannabinoids are present in lesser amounts and do not have psychotropic effects.

Health Canada officials reported that marijuana in Canada today has a much higher THC than in the past. US data shows cannabis in the 1980s to have 1% THC to between 10%-11% in 2011. Marijuana grown indoors on the west coast of Canada can have 30% or more THC content.

**Incidence of Use:**

Health Canada cites the 2012 Canadian Alcohol and Drug Use Monitoring Survey (CADUMS) showing that 10.2% of Canadians (mostly men) have used marijuana in the past year; 41.5% report using it at least once in their lifetime with 25% being chronic users. Dr. Perry Kendall, British Columbia's Chief Public Health Officer, cited the 2011 CADUMS survey showing 17.7% who use cannabis do so for medical purposes: 50% for pain and the other half for depression, insomnia and anxiety, which suggest a medical benefit of marijuana.

Incidence among youth remained at 20.3%. A UNICEF survey found that Canadian youth 11 to 15 are among the highest peer users in other developed countries which shows that the current system does not prevent youth use.

Dr. Philippe Lucas of the University of Victoria noted that, in other jurisdictions, regulated access to marijuana was associated with a decrease in recreational use of other drugs, such as alcohol and prescription drugs. Dr. Evan Wood of the BC Centre of Excellence for HIV/AIDS and Urban Health Research pointed out that the illegal status of marijuana does not prevent youth access, since 80% of young people in a US survey suggest cannabis is easy to attain. Dr. Le Foll of the University of Toronto and Dr. Didier Justras-Aswas of the Université de Montréal recommended legalizing marijuana through a system of strict regulation of use and taxation would help reduce its health risks and harms by allowing for control and oversight of content, including the levels of THC. This, in turn, would reduce the drugs addiction potential. The taxation could be used to promote less harmful ways of using marijuana, such as vapour systems. These testimonies were not included in the majority report. However, they were compelling enough for us to recommend:

**Recommendation 1: The Government of Canada explore a regulatory framework of legalization, working with experts in the field that aims to keep marijuana out of the hands of youth.**

#### **Perceptions of marijuana use by the public:**

Most youth and parents perceive marijuana to be harmless, compared with other drugs. Yet, the Canadian Centre on Substance Abuse studies report cannabis to be the second most widely used illicit drug among persons accessing publicly funded addiction services. Data from 2002 showed that hospitalisations in Canada related to cannabis accounted for 0.3%, alcohol for 5.8% and tobacco for 10.3%. In terms of cannabis, direct costs to the health care system in 2002, was \$73 million; alcohol \$3.3 billion and tobacco, \$4.4 billion. Most witnesses stressed the importance of raising awareness of potential health risks and harms as a key means of reducing the rate of use and cannabis-impaired driving. Dr. Tony George of the University of Toronto said studies in the United States found if the perception of harm among youth increases, the rate of cannabis use decreases, but warned that youth public awareness campaigns need to focus on accurate information, rather than using “scare” tactics, which have been shown to be less effective. This leads us to make the following recommendation:

**Recommendation 2: The Government of Canada work with relevant stakeholders and experts to develop a campaign to raise public awareness and knowledge of the risks and harms associated with marijuana use.**

Some witnesses stated that health risks attributed to marijuana use ranged from cognitive impairment, brain development, respiratory effects, mental health problems, motor vehicle accidents and cardiovascular disease. Specifically, it impairs decision-making ability, reaction time and memory, yet this effect was higher in infrequent users than chronic users. Yet, many other witnesses noted that there was no direct causality between chronic marijuana use and long-term cognitive deficits. Indeed there was a

comprehensive meta-analysis at the University of British Columbia that showed no substantial systemic effect of long-term cannabis use and neurocognitive function.

Some witnesses suggested there were long-term effects of marijuana toxicity on the lungs, associated with lung cancer, yet others suggested that research in this area is unclear and more studies are necessary.

Some witnesses linked marijuana with impairment of cognitive and psycho-motor skills that could lead to driver impairment; yet others suggest that many of the traffic fatalities related to cannabis use included multi-drug use or cannabis use in combination with alcohol.

Some researchers pointed out that in youth, however, MRIs and brain activity studies showed that the developing pre-frontal cortex in youth could make them more sensitive to the neuro-toxic effects of marijuana. Other researchers warned that other factors could contribute to intellectual attainment such as socio-economic status, social stress and personality characteristics.

In summary, there was contradictory evidence about the benefits and harms of cannabis. Some researchers say that cannabis increases anxiety and psychosis. Other point to the anti-psychotic effects of cannabidiol (CBD) and cannabigerol (CBG). Some report evidence of panic-attacks and increased depression and others give evidence of the anti-anxiety effects especially in chronic pain conditions, such as Multiple Sclerosis and HIV/AIDS and in Post-Traumatic Stress Disorder. In fact, Veterans Affairs Canada pays for the cost of medical marijuana for PTSD patients.

Much of the contradictory testimony was not included in the majority report. Yet, the vast majority of witnesses pointed to inconclusive evidence, so far, of direct harms and risks and to the need for research on benefits of cannabis; the relationship between cannabis use and long-term brain development and intellectual attainment in youth.

**Recommendation 3: The Government of Canada fund research aimed at improving the understanding of the short- and long-term harms and benefits related to marijuana use among all cohorts of society.**

It is unfortunate that much of the evidence from credible witnesses that have a differing view of the government is not included in the report. It is also unfortunate that many of the suggested recommendations of many witnesses for further research into the possible medical benefits of cannabis were entirely absent from the Committee's report.

**List of Recommendations:**

- 1. The Government of Canada explore a regulatory framework of legalization, working with experts in the field that aims to keep marijuana out of the hands of youth.**

- 2. The Government of Canada work with relevant stakeholders and experts to develop a campaign to raise public awareness and knowledge of the risks and harms associated with marijuana use.**
- 3. The Government of Canada fund research aimed at improving understanding of the short- and long-term harms and benefits related to marijuana use among all cohorts of society.**