



# **Ontario's Doctors Help You Make Informed Decisions: Clearing the Air About Adult Use Cannabis**

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## **Clearing the Air About Adult Use Cannabis**

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There has been a recent rise in cannabis use, presumably due to changing views on the use of cannabis for medicinal purposes as well as changing attitudes about recreational or adult use cannabis (1). Greater discussion regarding medicinal applications, coupled with the legalization of recreational cannabis may have led some to believe that this drug is harmless and has no potential adverse effects. Ontario's doctors believe that it is important that physicians and the public have scientific information about adult use cannabis and how it can impact health.

Patients turn to physicians as a trusted voice on a wide variety of health issues, including the impacts of cannabis use. That said, to date there have been insufficient resources allocated to cannabis research. As a result, there is a gap in evidence-based information, which poses a public health risk and leaves physicians ill equipped to inform and best support patients.

With the goal of contributing to the public dialogue on the topic, the Ontario Medical Association (OMA) has developed this paper to bring attention to the health facts surrounding adult use cannabis. This paper will outline facts about cannabis use, the addictive consequences, side effects and risks of second hand smoke, as well as issues around driving under the influence.

It is important to note from the outset that the field of cannabis is evolving, including research and policy development, industry innovation, as well as some of the language used when discussing cannabis. For the purposes of this paper, 'recreational marijuana' will be referred to as adult use cannabis.

It is critical to note that this paper does not deal with the use of cannabis in a clinical context. Given the breadth of public and policy discussion about cannabis used as a medicine, it is important to recognize that some could deduce that it is safe to use in either a medical or recreational setting. It is important to remember that medicines are not by definition "safe." The fact that a substance has a medical use does not mean that it can be used without concern for negative effects.

### **Adult Use Cannabis is inherently harmful**

If there is public dialogue that supports the promotion of cannabis for treatment of certain kinds of illness or symptoms, then the public perception of it as a harmful drug is likely to decrease.

Ontario's doctors think it is important to inform the public that adult use cannabis has serious health effects, and that using it has risks.

Despite its popularity, adult use cannabis is associated with a number of negative health risks, especially for those who use it frequently or begin to use at an early age. These health impacts include addictive consequences, a range of respiratory and circulatory diseases and disorders, cognitive effects as well as harmful effects on the mental health of some individuals.

Even though it will be/is legal, it is important to remember that cannabis is an inherently harmful substance, and it must be treated as such when it is used recreationally. The health risks caused by adult use cannabis use can best be avoided by abstaining from cannabis use.

## Cannabis Use in Canada

Cannabis is the most prevalently used recreational drug in the country (2). The Canadian Alcohol and Drug Use Monitoring Survey noted a rise in past-year cannabis use prevalence from 11% (3.1 million) in 2013 to 12% (3.6 million) in Canada (3). Among this population, past-year cannabis use was more prevalent among males at 15% (2.2 million) when compared to female users who accounted for 10% (1.4 million) (3). Among past-year cannabis users, 33% (840,000) reported using cannabis on a daily or almost daily basis and the majority (72% or 2.6 million) reported using cannabis in the past 3 months (3). The survey found that 28% (999,000) of past-year cannabis users consumed via a vaporizer (3).

Cannabis use is more prevalent among youth aged 15 to 19 (21% or 426,000) and young adults aged 20 to 24 (30% or 715,000) (3). The median age to start using cannabis was 17 years old for both males and females, this is unchanged from 2013 (3). Adults 25 years and older accounted for 10% of cannabis users, a slight increase of 2% (3).

## Consumption Methods

There are several common cannabis consumption methods In Canada, federal law dictates what forms of cannabis can be legally sold. Initially, dried and fresh cannabis, cannabis oil and cannabis accessories will be available for sale. The federal government has stated that edibles will be legalized at a future date. With a lack of research around cannabis, it is difficult to recommend one consumption method over others from a health and safety perspective. That said, users should remember irrespective of the substance, smoking is harmful to the respiratory tract. The following is a list of some common consumption methods:

### Smoking

Smoking is the most common cannabis consumption method. The user will use the dried flower from the cannabis plant to roll a joint, or use a pipe or bong. Smoking cannabis delivers cannabinoids into the system very quickly, and users typically feel the effects of smoked cannabis within seconds of inhalation (4).

### Vaporizers

Vaporizers are devices that heat rather than combust cannabis. Vaporizers pull the active ingredients from cannabis, including THC, and store the vapor in a component of the vaporizer. The user inhales the cannabis vapour rather than cannabis smoke

It may be useful for you to be aware of different terms and words used to describe cannabis. Language and terminology may vary depending on social groups, age, culture and communities (39).

The Government of Canada lists the following as additional names for cannabis:

- Marijuana
- Pot
- Bud
- Dope
- Weed
- Mary Jane (MJ)
- Herb
- Ganja
- Honeycomb
- Trees
- Gangster
- Skunk
- Shatter
- Budder
- Errl
- Wax
- Dank or dank krippy
- Purp
- Keef
- Rosin
- Boom
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A prepared amount of cannabis that is made for smoking may be called:

- Joint
- Spliff
- Doobie

(5). Vaporizers can use dried cannabis plant matter or its oil. Users generally feel the influence of vaping cannabis within seconds of inhalation (4).

There is speculation that this mode of administration may minimize some of the respiratory harms associated with smoking cannabis. Small short-term studies have found improvement in some self-reported respiratory symptoms and found reduced expired carbon monoxide levels (6). There are currently no long-term outcome studies on the long term differences in respiratory outcomes. It is important to note that the various other risks involved with cannabis use remain regardless of mode of administration (addiction, mental health, cognition, driving impacts and impaired judgement) (7).

### Cannabis Oil

Cannabis oil is a highly concentrated cannabis extract where a solvent has been used to separate essential oils of the cannabis plant. The end product is a highly concentrated cannabinoid product. Users can feel the effects within 15 minutes to 1 hour (4).

### Edibles

Cannabis in edible form can be ingested in a number of ways, including cookies, brownies, snacks, chocolate, pizza, candies, and sodas. Consuming cannabis in edible form means that each user can feel the impact of ingestion at a different time depending on metabolism and whether the user ingests cannabis with other food or on an empty stomach (4). Users often feel the effects within 15 minutes to two hours of ingestion (4).

### Tinctures

Cannabis tinctures are alcohol-based cannabis extracts. Users place a small amount (usually around 1mL) of the tincture under their tongue. Tinctures can be incorporated into cooking and drinks (8). Users will feel the effects of alcohol-based tinctures within 20-30 minutes (4).

### Dabbing or Shattering

Dabs are concentrated doses of cannabis made from extracting THC and other cannabinoids. Users heat the cannabis concentrate or dab on a hot surface and then inhaled through a dab rig. Dabs can contain up to 80% THC and users typically feel the effects immediately after inhalation (4).

## **Mental Health and Addiction**

### ***Cannabis and mental health***

Cannabis use can have specific harmful effects on the mental health of some individuals, and general harmful effects on most users. The use of cannabis has been found to contribute to anxiety and depression by increasing the negative feelings associated with these conditions, both when a person is high and when they are not (9). Emerging evidence suggests that using cannabis during teenage years is linked to the development of mood and anxiety disorders (10). Researchers think that negative mood states and cannabis interact in a complex way: some people use cannabis to cope with mild (sub-threshold) symptoms, but this use actually increases these symptoms in the long-term (10). This can lead to a cycle of reliance upon cannabis to self-medicate during negative moods.

Cannabis use in the teen years has been associated with increased likelihood of developing psychiatric disorders later in life (11). A steadily increasing number of studies on cannabis use and schizophrenia suggest that cannabis use quickly brings out this illness in individuals who have a predisposition (through family history, for example) (12, 13). There are two primary effects of cannabis use on schizophrenia: first, regular cannabis users experience early onset, and second, individuals who use cannabis regularly and have schizophrenia experience worse symptoms (i.e., spend more time in an acute state for schizophrenia) (13). Other studies further suggest that the use of cannabis actually leads to a greater incidence of schizophrenia at the population level, (13, 14) with one meta-analysis giving an odds ratio of 1.42 of developing psychosis for those who had ever used cannabis and an odds ratio of 2.09 for frequent users (15).

### ***Addiction and Problematic Use***

One of the most pervasive beliefs about cannabis is that it is not addictive, or at least not as addictive as many of the other addictive substances. The prevailing theory is that for many people, using cannabis as a teenager or young adult does not progress into dependence or abuse, but rather wanes as one progresses into adulthood. However, Health Canada states that cannabis can be addictive and that about 1 in 11 cannabis users will become addicted. The risk for addiction rises to 1 in 6 for individuals who start using as a teen (1).

The latest version of the American Psychiatric Association's Diagnostic and Statistical Manual (DSM-V) includes cannabis (marijuana) use disorder, and describes it as "a problematic pattern of cannabis use leading to clinically significant impairment or distress," and provides a list of symptoms which would indicate this condition (16). These symptoms include tolerance and withdrawal, which are also seen in other addictive substances such as alcohol and tobacco. Cannabis withdrawal includes irritability, anger or aggression, anxiety, depressed mood, restlessness, difficulty sleeping, decreased appetite, and weight loss (16).

**Addiction** – Someone with addiction often has an uncontrollable to use a substance, despite it causing negative consequences or difficulties in their life or they want to quit. (40)

**Problematic use** – Someone who is facing negative health and social consequences from using a substance. For example, drop in attendance at school or difficulties with memory, concentration or relationships. (40)

The development of cannabis dependence is more likely in individuals who have high anxiety and genetic risk for addiction (10). Using cannabis in the early teenage years, when the brain is going through a period of rapid development, may lead individuals with underlying genetic and behavioural vulnerability to abuse or become dependent on this drug (10). Adolescence is the most common time for the onset of a cannabis use disorder (16). As well, an emerging body of literature suggests that cannabis use is associated with greater reported nicotine addiction among adolescent smokers. Several studies, including population based epidemiologic studies have identified that more than half of the adolescents who start smoking in their early teens combine tobacco consumption with other psychoactive products, especially alcohol and cannabis (17, 18). Adolescents who smoke high amounts of cannabis (more than 10 joints per month) started smoking tobacco earlier (11.7 years versus 13.2 years) and demonstrated addictive behaviours related to both substances (18). The evidence indicates that cannabis plays a role in potentiating nicotine addiction (17, 18).

Nicotine as it relates to cannabis use is not the only consideration. Understanding the patterns of comorbid substance use, particularly among adolescents is essential to address the resulting harm,

including addiction. The use of cannabis, tobacco and alcohol (among other substances) tends to cluster in adolescents, with clear association between the use of one of these substances increasing the likelihood of the use of others (19). Most importantly perhaps, comorbid use of cannabis, tobacco, and alcohol, where all three of these substances are used together or within a short time frame has been consistently related to heavier patterns of consumption in adulthood and higher rates of addiction (19, 20) Use of a greater number of substances and early age of onset of use predict later substance dependence (21).

Additionally, many users who do not meet the criteria for addiction still report significant problems related to their cannabis use. A Canadian survey of 1800 individuals who have used cannabis in the past year found that 4.9% reported health, social or legal problems in the last 3 months, while 6.9% reported failed expectations in the past 3 months (22).

### ***Cognitive effects***

Besides respiratory diseases and addiction, smoking cannabis is known to have negative effects on cognition; both short and long term. These effects include difficulties with attention, problem solving and impaired judgment, decision making and the ability to learn by appropriately processing and retaining information. The immediate effects normally lessen within about six hours of use, although cognitive impacts have been seen for up to 3 weeks after cessation of use (23). However, of more concern perhaps is the evidence that when cannabis is used regularly before the age of 18 years there is long lasting or permanent cognitive decline (23).

The evidence shows that brain development can be affected by cannabis use, especially if a person starts using it as a teenager. In a meta-analysis conducted in 2003, evidence of mental impairments in the ability to learn and remember new information was reported in chronic cannabis smokers (9). Researchers are beginning to determine how it is that cannabis causes these effects, and suspect that cannabis use during developmentally-sensitive periods like adolescence could be responsible for the long-lasting deficits seen in mental functioning (11). Research has established that people who begin to use cannabis in their early teens (before age 15) achieve poor test scores in tasks of executive brain functioning (working memory, abstract thinking, impulse control, etc.), and do significantly worse than people who began to use cannabis in late teens or adulthood (11). Furthermore, such individuals have an increased risk of leaving school early or attaining a lower level of education (24).

People who use cannabis heavily over time seem to suffer a long lasting reduction in the capacity to learn. In a prospective cohort study, researchers found that people who never used cannabis experienced a slight increase in IQ over their lives, whereas those who had been diagnosed with cannabis dependence at some point experienced IQ declines (12). This research showed that across different areas of mental function, people with more persistent cannabis use generally showed greater impairment in brain functioning. The greatest impairments were found in executive functioning and processing speed (12). As with other studies, this research found that impairment was concentrated among people who started using cannabis in their early teens.

Though much remains unknown about how cannabis causes the effects seen in these studies, a growing body of evidence indicates that using cannabis leads to acute cognitive impairment and use that starts during adolescence can lead to long-term cognitive impairments.

Both the federal and provincial governments have outlined that one of the key reasons for legalizing cannabis is to protect youth and to establish safeguards so that illegal cannabis is not accessible to underage individuals. In order to achieve this goal, a minimum age to purchase, possess, and use cannabis must be set. Establishing a minimum age has been an important control measure for both alcohol and tobacco in Ontario. In regard to setting a minimum age for purchasing and possessing cannabis, the Ontario government must focus first and foremost on health risks.

There is strong evidence showing cannabis use impacts brain development. It is known that the brain continues to develop through early adulthood, until the age of 25 (25, 11). Therefore, Ontario's doctors have recommended that the minimum age for purchase and use of cannabis should be 25.

In other North American jurisdictions where cannabis has been legalized, the minimum age has been set to mirror that of alcohol, usually at 21 years or older. In Ontario, the precedent set by the legal age of smoking tobacco at 19 will likely be used as reasoning to lower the age of sale, use and possession of cannabis to 19 years as well. Adopting a minimum age of under 25 years for cannabis use based on precedent set for tobacco and alcohol ignores scientific evidence around the negative health impacts on brain development.

### **Cannabis smoke & Second-hand smoke**

Smoked substances cause a range of respiratory and circulatory diseases and disorders. While the evidence is just beginning to emerge about associations with cardiac complications, there is evidence that smoked cannabis can precipitate angina and myocardial infarction in the short term (26). Increased reporting of cardiovascular complications related to cannabis and their extreme seriousness (with a death rate of 25.6%) indicate cannabis as a possible risk factor for cardiovascular disease in young adults (27).

Tar from a cannabis cigarette harms the lungs in much the same way that tar from tobacco cigarettes does, with some studies showing a greater amount of tar deposited in the lungs of cannabis smokers (over cigarette smokers) (28). Research studying the correlation between cannabis smoking and lung cancer has been limited to date because of the often associated use of tobacco among cannabis users (26). However, a recently reported retrospective cohort study has shed some light on the subject through a 40-year retrospective study of 50000 Swedish adult males. The study reports that even after controlling for tobacco use and other factors, regular cannabis smoking was shown to be associated with a 2-fold increased risk of lung cancer (29). Also, because cannabis smokers tend to inhale more deeply and hold their breath for longer, cancer-causing agents travel further into the lungs (28).

Another recent study found that among heavy cannabis users (defined as having smoked more than 50 "joints" over their lifetime), the risk of lung cancer doubled (29). Therefore, the evidence indicates that smoking cannabis does increase the chance of developing respiratory disease, including, but not limited to lung cancer (29).

Ensuring that cannabis users are educated on the health impacts that smoking cannabis can have, as well as protecting the general public from the effects of second hand smoke are critical from a public health perspective.

Smoking cannabis should not be permitted in any public space due to the risk of second hand smoke. This principle is consistent with existing smoking legislation in Ontario (30). Research shows that smoke-free policies and smoking bans are associated with reduced youth initiation rates as well as improved health outcomes of smoking related diseases (31). As such, all smoked products should be included under such bans and policies.

Exposure to all smoke, including cannabis smoke, can trigger acute and chronic health issues, including cardiovascular events, asthma, cancers, chronic obstructive pulmonary disease, and a range of respiratory conditions. Exposure to second hand cannabis smoke contains many of the same toxins found in cannabis smoke that is directly inhaled, including carcinogens (32). As with second hand tobacco smoke, particular attention should be focused on second hand cannabis smoke and children. Therefore, in addition to restrictions in public spaces, other restrictions might be considered to ensure children are not exposed to the harmful health impacts of second hand cannabis smoke (33).

#### **Driving while under the influence**

While the effects of cannabis are different from alcohol, it similarly impairs reaction times and the ability to concentrate on the road. When a person consumes cannabis, his/her heart rate increases, short-term memory is impaired, and attention, motor skills, reaction time, and the organization of complex information are all reduced. All of these impacts are crucial for driving a vehicle (9, 34).

Further, when individuals consume adult use cannabis, it is often with the intention of feeling its effects and its 'high'. This is in contrast to alcohol, where some individuals may drink with the intention of becoming drunk, while others may consume alcohol moderately and responsibly without feeling its effects.

It is important to keep in mind that there is an association between alcohol and cannabis use. Simultaneous use of cannabis and alcohol has been associated with "severe impairment of cognitive, psychomotor, and actual driving performance in experimental studies and sharply increased the crash risk in epidemiological analyses" (35). Adolescents have shown to have a high rate of simultaneous use with an American study showing that 23% of high school seniors reported such use in the last year (36). This study concludes that there is general increased risk-taking associated with simultaneous use of cannabis and alcohol, with an increased risk of unsafe driving and a higher likelihood that they will drive after substance use (37).

In the absence of concrete evidence, there is no standard recommendation that can be put forward at this time as to how long an individual should wait to drive after consuming adult use cannabis. Different strains of cannabis, method of consumption as well as individual metabolisms will impact how long the effects of cannabis last. Greater research in this field is critical.

## **Conclusion**

Amidst the current political and public dialogue about the medical use of cannabis and legalized adult use cannabis, cannabis use lies in a cultural grey area, between acceptance and disapproval. The OMA believes that it is important that Ontarians are aware of the harms associated with cannabis use. Smoking cannabis is bad for your health in a number of ways: it causes respiratory illnesses including lung cancer, it can contribute to memory loss and cognitive decline, it is associated with possible psychosis and increases risky behaviour, and it can be addictive. These impacts are heightened when use begins at an early age. Moreover, there are other serious consequences of cannabis use for people other than the user, particularly if a person decides to drive while under cannabis's influence. Enhanced public awareness about the health effects of using cannabis is required, so that people who consider using adult use cannabis are informed of the risks

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