

Implications of the Legalization of Marijuana -

Is it High Times?

or

Should we Keep off the Grass?

What is Federally legal as of October 17, 2018*

- Subject to provincial or territorial restrictions, adults who are 18 years of age or older are legally able to:
- possess up to 30 grams (one ounce) of legal cannabis, dried or equivalent in non-dried form in public

What is legal in Ontario as of October 17, 2018 with the Ford Government*

- An individual can buy up to 30 gms of dried marihuana (like Federal laws)
- Can grow up to 4 plants per residence (not per person)
- This differs from province to province. E.g. Quebec can't grow your own
- Can use in private residence and many public places (e.g. parks, sidewalks)
- But NOT at parks where kids are, schools, workplaces, publicly owned places (sportsfields), restaurant and bar patios
- Objective is to limit second hand exposure and reduce youth exposure.

States where marijuana is legal

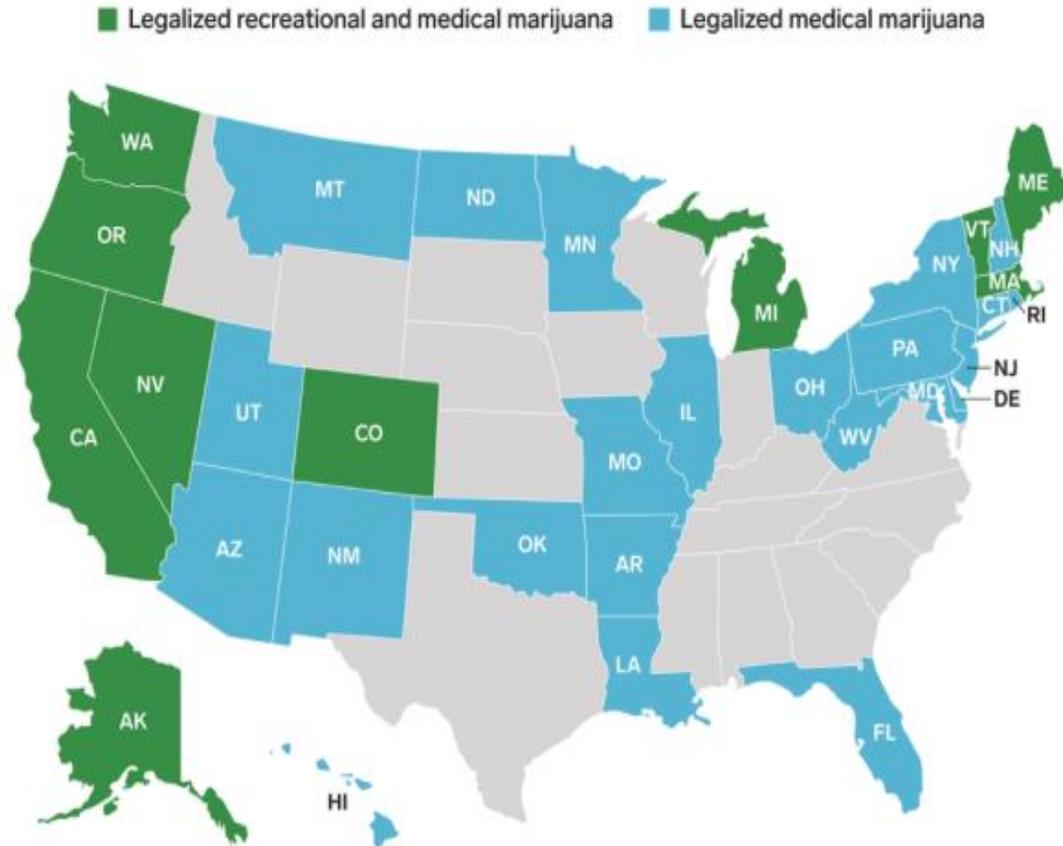
As of January 2019*

Recreational marijuana is legal in 10 States

Medical marijuana is legal in 33 States

The laws for both these situations varies from State to State

Federally, Marijuana is still illegal



Usage patterns*

- In high-income countries, cannabis use usually begins in the mid-to-late teens.
- Heaviest use occurs in the early twenties and declines throughout the late twenties into the early thirties.
- About 10% of people who use cannabis become daily users and another 20–30% use it weekly.

Objectives of the Marihuana legislation in Canada*

- The Government of Canada believes that the new regime for legal access to marijuana must achieve the following objectives:
- Protect young Canadians by keeping marijuana out of the hands of children and youth.
- Keep profits out of the hands of criminals, particularly organized crime.
- Reduce the burdens on police and the justice system associated with simple possession of marijuana offences.
- Prevent Canadians from entering the criminal justice system and receiving criminal records for simple marijuana possession offences.

Objectives of the Marihuana legislation*

- When considering how best to minimize harms associated with marijuana use, it is helpful to consider the two different approaches taken in controlling tobacco and alcohol use.
- In the case of tobacco, the overall objective is to reduce or even eliminate use for all Canadians.
- In contrast, the overall objective with respect to alcohol is to promote responsible use amongst adults, and to prohibit use amongst youth.
- These objectives are achieved largely through actions such as setting a minimum age for purchase, educational tools aimed at promoting responsible use, and taxation measures.

Objectives of the Marihuana legislation*

- These two examples highlight different regulatory approaches and point to the potential for regulation of the same product by different orders of government.
- The early experiences of Colorado and Washington State suggest that the Government should take steps to avoid the commercialization of legalized marijuana
- including the limiting of active promoting and marketing of marijuana, leading to widespread use
- So Ottawa is adopting the cigarette model rather than the alcohol 'normalization' approach

The plant*

- Cannabis preparations are usually obtained from the female *Cannabis sativa* or *Cannabis Indica* plants.
- The plant contains at least 750 chemicals and some 104 different cannabinoids
- The principal cannabinoids in the cannabis plant include delta-9-tetrahydrocannabinol (THC), cannabidiol (CBD), and cannabinol (CBN).
- Remember CBD as I will talk a little about this regarding medical marijuana.

The plant's chemistry*

- . The cannabinoid that is primarily responsible for the psychoactive effects sought by cannabis users is THC
- THC is found in a resin that covers the flowering tops and upper leaves of the female plant.
- Most of the other cannabinoids are either inactive or only weakly active, although some, such as CBD, may modify the psychoactive effects of THC

The plant's chemistry*

- There has been an upward trend in the mean THC content of all confiscated cannabis preparations in North America and in some European countries.
- The breeding of different strains has yielded plants and resins with dramatic increases in THC content over the past decade, from around 3% to 12–16% or higher (% of THC weight per dry weight of cannabis) with differences in different countries.

What happens when you smoke up*

- When a person smokes up a number of chemicals enter the brain including tetrahydrocannabinol (THC) thought to be the major psychoactive ingredient in marijuana.
- THC latches on to a protein in the brain called cannabinoid receptor type 1, or CB1.
- These receptors are sprinkled liberally throughout the brain but in rather specific regions.

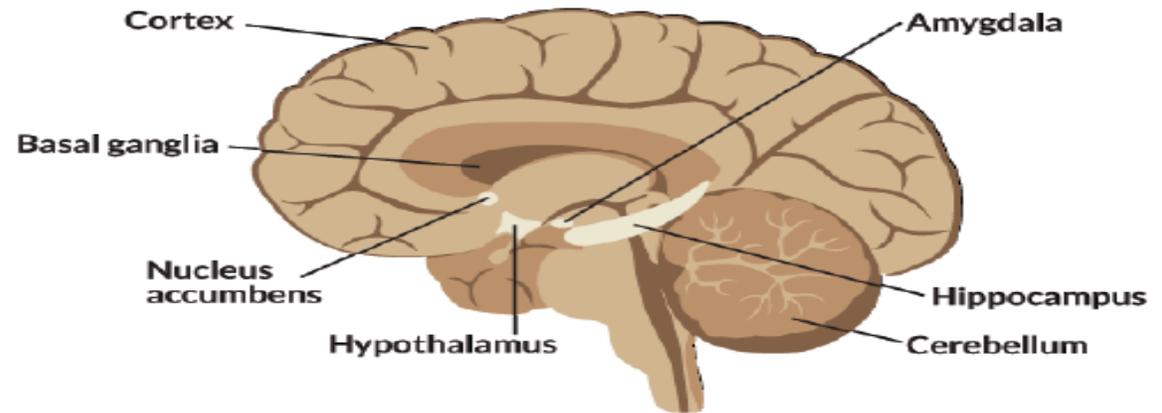
Brain regions affected by marijuana

Amygdala Can alter emotional states

Basal ganglia Reduces motor activity; users may move less

Cerebellum Can impair coordination

Cortex May alter complex thinking, making it hard to pay attention or switch quickly between two tasks

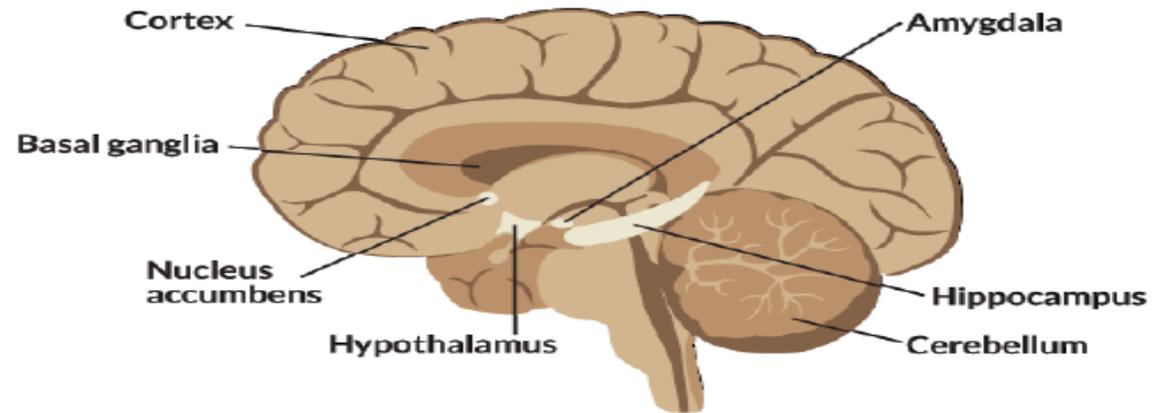


Brain regions affected by marijuana

Hippocampus Memory center becomes less efficient, making it harder to learn and remember new information

Hypothalamus Stimulates appetite, giving marijuana users the well-known "munchies" effect

Nucleus accumbens is part of the brain's reward system and obviously, is the key for the positive aspects of marijuana's usage.



THC and Dopamine*

- Dopamine producing neurons are controlled by the neurotransmitters glutamate and gamma-aminobutyric acid (GABA)
- Glutamate is involved with the release of dopamine whereas GABA tends to inhibit such a release.
- Anandamide (a neurotransmitter itself) is involved with the balance of these two transmitters
- THC inhibits the production of GABA, resulting in more dopamine being produced and a sense of pleasure.

Medical Value of Marijuana*

- In recent years, the recognition that CBD (Cannabidiol) may be the chemical in marijuana that has medicinal properties
- Promising as CBD is largely devoid of psychoactive effects.
- But may need a small amount of THC to enhance its medical properties.
- The ratio of CBD to THC is a very active area of research

Summary of the Medical Value of Marijuana*

- There is potential therapeutic value of cannabinoids (primarily CBD) for
 - Pain relief (chronic: not acute)
 - Control of nausea and vomiting
 - Appetite stimulation
 - Multiple Sclerosis
 - Certain type of seizures in children
- Smoked marijuana however, is a crude delivery system that also delivers harmful substances.
- So this segues into how marijuana is smoked
- Vaping - that I will talk about next- may be a partial answer

Vaping*

- One increasingly popular way of administering cannabis is the use of vaporizers.
- Vaporizers heat any form of Cannabis to 165-190 Celsius causing the active ingredients to evaporate into a vapor without burning/combusting the plant material
- vaporization of cannabis has been postulated as safer than smoking
- Inhalation by smoking or vaporization releases maximal levels of THC into the blood within minutes, peaking at 15–30 minutes and decreasing within 2–3 hours.

Health Risk*

- age at which use begins;
- frequency of use;
- duration of use;
- amount used and potency of the product;
- a user's actions while intoxicated, such as driving or consuming other substances or medications; and,
- a user's health status and medical, personal, and family health history.
- Smoking up may potentiate existing psychological conditions

More on Addiction*

About one user in 10 becomes dependent, defined by criteria described in the Diagnostic and Statistical Manual of Mental Disorders. As compared to 32% nicotine; 23% heroin; 17% cocaine; 15% alcohol

- Those criteria include two key features: tolerance and withdrawal
- I would also add the need for the drug to deal with stress- if it becomes the only way of dealing with that state.

Adolescence & Use*

- Adolescence is a critical stage in human development that is characterized by substantial changes in physical, psychological and social domains
- This includes the ability to perform complex cognitive tasks and regulate affect and behavior in order to achieve long term goals.
- As you will see in a moment, the part of the brain involved in such tasks is continuing to develop during this period and this growth is impacted by marijuana use.

Cannabinoid Receptors and Endogenous Cannabinoids*

- The CB1 receptors are found at high levels in discrete parts of the brain, as described earlier, that are continued to be substantially remodeled ('plastic') during adolescence.
- Thus, as exogenous cannabinoids affect the function of the endocannabinoid system, marijuana exposure during adolescence can potentially disrupt this system at a critical stage of development.
- There is some evidence for this