



**NORDIC** September 27-28th 2021. Copenhagen, DENMARK  
**SUMMIT ON CANNABIS**

*LET'S START CHANGING THINGS  
– BEFORE IT IS TOO LATE*

September 27<sup>th</sup> – 28<sup>th</sup>,  
2021 Copenhagen

**WHITE  
GUIDE**



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**SUMMIT ON CANNABIS**

# WHITE GUIDE

*The White Guide will also soon be available in a printed version! For more details and if you would like to pre-order a printed version, send your request and contact details to [info@wfad.se](mailto:info@wfad.se). For 150 SEK (including transportation fees), we will send the printed booklet to your address!*

September, 2021

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# Introduction

Cannabis continues to be a theme in the public debate. And for good reasons. The many aspects of the sedative substance seem to be on everyone's lips, especially when a new study from the science emerges or whenever politicians suggest changing policies. We need to address this widely popular substance and get clear on every aspect from adverse health effects to implications on the youth if policies are changed.

The Nordic Summit on Cannabis arrives not one moment too early. We desperately need to inform the public, the treatment community, and politicians. The Nordic Countries are taking seemingly invisible, but nonetheless, rhetorical steps towards a legalisation of cannabis. We need to understand possible implications before any decisions are made. The delivery of evidence-based information is of paramount importance, if we, as a society and global community, hope to guide all parties toward less harm from this substance through misinformed guidelines.

The tangible outcome of The Nordic Summit on

Cannabis is in your hands. The booklet, or "White Guide", serves the purpose of bringing forward the essential information. With this information we can hopefully steer in another direction; towards sound policies that takes evidence into account – to protect the Nordic Countries from the influence of biased and commercial arguments and to protect the developing brain of young people from the harmful effects of cannabis.

In this White Guide the discussions and presentations of speakers are summarized.

On behalf of all of us behind the Nordic Summit on Cannabis, we sincerely hope that it will be used by civil society and others who strive to push against biased arguments and harmful policies.

Let's have a clear and evidence-based perspective for the sake of our youth and further generations.

*~ Danske Cannabis Behandlere, World Federation Against Drugs, and Forbundet Mot Rusgift*



# Cannabis Update in Denmark

**Written by Christopher Schmitz**

*Founder of Danske Cannabis Behandlere*

**Y**ou cannot say Denmark without saying Pusher Street and Christiania. A world-wide known phenomenon where you seemingly can buy cannabis right off the street in the middle of the capital. Seemingly, because this national tourist attraction lets visitors believe that cannabis can be bought legally in Denmark. This place and the easily accessible cannabis have been the centre of the legalisation debate in Denmark. However, more importantly, the problem is when it comes to communicating the harmful effects to the youth. The logic seems to be that cannabis cannot be harmful when it is sold on the street and in a place that historically is associated with peace and love. Understanding cannabis through that lens might explain the 95 per cent of young people under 18 years new in treatment indicate

that cannabis is their main substance and thereby reason for seeking treatment.<sup>1</sup> This easy access point for the youth to try out cannabis, has grown to be the epic centre of illegal cannabis activity following shootings and killings.

## **The legal situation of cannabis in Denmark**

Currently, recreational cannabis use and possession are not legally regulated. Also, the production, import/export, and buying and selling of cannabis are illegal in Denmark.<sup>2</sup> However, the debate on legalisation has been strongly apparent in media and politics over the years. The public, media, and politics seem to be increasingly leaning toward the legalisation of recreational cannabis. In January 2018, five of the nine national parliamentary parties showed their support for a state-controlled legalisation scheme.

During that time, the majority within the Danish parliament opposed legalisation and decriminalisation. However, several cities and municipalities have been openly in favour of the legalisation of recreational cannabis. For example, the city of Copenhagen has sent in several proposals. These proposals have been rejected until now. Even though recreational legalisation has not gained the needed political support yet, the parliament unanimously voted for a four-year trial on medi-

cal cannabis in December 2017. The trial did face opposition from Danish doctors due to the lack of beneficial medical evidence. However, the patient's association and the cannabis industry wish for the trial to become permanent or extended after its official end date, December 2021.<sup>3</sup> With Copenhagen continuing to push for legalisation, the current favourability of medical cannabis, and the positive media outlet, the discussion and the lobbying are still very much alive.



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# Swedish Drug Policy & the Ongoing Debate

**Written by Sara Heine**

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**T**here is a fairly intense debate in Sweden about its current drug policy and how it can be further developed. Today, all non-medical use of drugs is criminalised in Sweden. The criminalisation of the use of drugs was introduced in 1988 and a sharpening of penalties introducing imprisonment for a maximum of six months in 1993. In practice, imprisonment is not imposed for minor drug offences, but the inclusion of prison in the range of punishments authorises the police to carry out a body search and ask for a urine or blood test.

In comparison with other countries, Sweden has a low drug consumption. In total 3-4% of the total population has used Cannabis in the past year. When including all kinds of drugs, the number is around 9%. The level of consumption among

young people has been relatively stable in recent years, but the frequency of use has increased somewhat among young people who already use drugs. However, while consumption is relatively low, Sweden has a high rate of drug-related deaths. An increase in police arrests and a judgement of the Supreme Court concerning the sale of Fentanyl has led to a decrease in drug-related deaths among men, whereas an increase among women has been seen.<sup>1,2</sup>

## **The ongoing debate**

The comparatively high drug-related deaths have led to a debate about the Swedish drug policy, presenting the policy as failed and outdated. Yet, no definition or reflection is made on what the drug Swedish drug policy actually includes. What part of the policy is outdated, unsuccessful? Nar-

rowed discussions see decriminalisation or legalisation as the only solution. The focus of the debate is on mortality and the need to provide support and treatment for those with addiction and lesser on prevention, early intervention, and the benefits of maintaining a low level of consumption. The negative consequences of drugs are seldom a part of the debate and some debaters are beginning to distinguish between the so-called “recreational use” – which they find unproblematic – and addiction. The Swedish debate is also influenced by the ongoing debate in Norway, Finland, and other European countries. The legalisation of cannabis in Canada and some states in the United States have also been used as arguments for decriminalisation or legalisation. However, the actual lessons learned from the development in the US and Canada are not reflected in the debate.<sup>3</sup>

### The way forward

In some countries in Europe with new decriminalisation legislation, a clear connection between le-

galisation and mortality has not been seen. The Narkotikapolitiskt Centre sees the importance of maintaining the current criminalisation, based on the risk that decriminalisation could increase, accelerate a shift in norms and attitudes towards drugs and reduce the tools for the police, social care, and other actors to work with early intervention. While criminalisation seems to have a dampening effect on consumption and provides an opportunity for early intervention, it also has its challenges. Therefore, instead of an inquiry into decriminalisation, an evaluation of the positive and negative effects of criminalisation is needed while proposing measures that can reduce the latter. We can both maintain the current criminalisation and at the same time work for better care and treatment. Those working with drug-related issues on a local or regional level see gaps in the system for early intervention, comorbidity, and in the current organisation of care and treatment but also see possible results when the gaps are sealed. Measures that can contribute to a humane and restrictive drug policy.



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# The Drug Policy Situation in Norway

**Written by Knut T. Reinås**

*Head of the Board at Forbundet Mot Rusgift (The League Against Intoxicants)*

Norway has for many years gone in the drug-liberal direction. In 2018, the Norwegian government set up a committee to study how the reactions to possession for own use and the use of small amounts of drugs should be changed from punishment to help. Just before Christmas 2019, the committee presented a proposal to decriminalize such offenses, which means reacting with impunity. After much discussion, the government presented a proposal in accordance with this. The government parties, the Conservatives, the Liberals, and the Christian Party voted for this in the Storting (Parliament) on 3 June, together with two leftwing

parties and the Green Party. While the Labor Party, the Center Party and the Progress Party voted against. A narrow majority therefore voted the proposal down. There are parliamentary elections in Norway this autumn, and opinion polls indicate that there will be a change of government. Among the parties that can enter government, or become support parties, there are several who are in favor of decriminalization, even if two of the probable government parties, Labour and the Center party are strongly against it. It is therefore still uncertain which negotiations will be carried out and which drug policy course Norway will follow in the near future.



# Medical Cannabis

**Written by Stig Erik Sørheim**

*Head of the International Department of Actis*

An increasing number of countries in Europe and elsewhere have allowed the medical use of some form of cannabis. Global cannabis companies have set up cannabis production facilities in several European countries, including Denmark.

Rules and regulations differ from country to country. Some allow the use of the whole plant, some have approved various cannabinoid-based pharmaceutical products, some have approved products with a standardized content of cannabinoids, and some have schemes that make cannabinoid-based products available to patients in exceptional cases.

Despite these rapid developments, the evidence base for cannabis and cannabis-based medicines is still limited.

In many jurisdictions, medical cannabis has been approved by referenda and public opinion, thus bypassing conventional approval procedures for medicines. The conditions that qualify for medical cannabis are highly variable and inconsistent from one jurisdiction to another.

There is a plethora of anecdotal evidence and small studies that point to possible effects. However, large, high-quality studies are rare. In most cases, there is simply not enough evidence to say with certainty if there is a medical effect or not. Future studies will hopefully shed more light on this.

Meanwhile, the harmful effects of cannabis are well documented. Studies of medical cannabis also point to common adverse effects. So far, the claims of effectiveness have outpaced the ev-

idence and it is time to take stock of the evidence before we rush to approve a treatment with uncertain effect and well documented harms.

### Medical use of controlled drugs

The UN drug conventions allow the use of controlled substances for medical and scientific purposes. Many regulated drugs are used medically, and if the evidence supports medical use of cannabis, there is no reason why it could not be used for medical purposes.

Cannabis is used to treat a wide variety of conditions, the most common of which is pain. For most of these, the evidence is simply not there. It is possible that future studies will provide the missing evidence. However, it is also possible that they will show that there is little or no effect.

Medical use requires medical grade evidence for safety and effect, as well as clear guidelines for dosing, mode of ingestion, frequency of dosing etc. In most cases, this information is not available.

The strict regulation of cannabis is sometimes identified as an obstacle to research. Although the UN drug conventions explicitly allow the scientific study of controlled drugs, researchers frequently argue that special application and authorization requirements cause unnecessary complications.

In the Nordic countries, the most common cannabinoid-based medicine is Sativex, which is used to treat spasticity in Multiple Sclerosis. However, in recent years a small, but growing group of patients in all countries have been prescribed standardized dried cannabis (Bediol, Bedrocan). Cannabis-preparations are not always covered by the state health system, which means that they can be quite expensive for the end user.

### A complex substance

Cannabis is a complex plant with many different chemical compounds, including cannabinoids, terpenes, and flavonoids. Furthermore, cannabis is not just cannabis. There are numerous varie-

ties and strains with varying content of “active” compounds, and there are different modes of ingestion (eating, drinking, smoking, vaping, topical creams etc.) with different pharmacological effects.

Some pharmaceutical cannabinoid-based medicines isolate the active ingredients in clearly defined doses and have gone through clinical trials to prove that they are safe and effective to treat certain conditions. Several cannabinoid-based products have been approved by national medicines authorities, including Marinol (THC), Epidiolex (CBD), and Sativex (mix of THC and CBD). There are also some standardized variants of plant-based cannabis that are used in some countries (e.g., Bedrocan).

### Evidence for effect

There is evidence for the use of some cannabinoid-based medicines. Sativex (a combination of THC and CBD) is used as an alternative treatment for Multiple Sclerosis, and Epidiolex (CBD) has been found to reduce seizures in some rare forms of childhood epilepsy. Furthermore, cannabinoids are more effective than placebo in reducing nausea in connection with chemotherapy, though it has not been tested against modern antiemetics.<sup>1</sup>

The most common condition treated with cannabis is chronic pain. A large review by the National Academy of Sciences in 2017 found strong evidence for effect.<sup>2</sup> However, the review looked mainly at synthetic and pharmaceutical cannabinoids, not the plant-based cannabis widely used in the US and Canada. Furthermore, later studies have been less supportive. A recent 2-year review by the International Society for the Study of Pain concluded that the evidence was not clear and currently recommended against the use of cannabinoids for chronic pain.<sup>3</sup>

Although the current evidence for effect is limited, it is still possible that cannabinoid-based medicines have a role to play as an alternative treatment for patients who don't respond well to the most common treatment options. There may also be sub-populations who may benefit, even if the majority do not.

There are numerous ongoing studies on cannabinoids for a variety of conditions. It is possible that better and larger studies will find evidence for cannabinoid-based medicines for some conditions. However, it is also possible that future studies will find a lack of effect.

### Do no harm

It is not just a question whether cannabinoid-based medicines are effective or not. Adverse effects are common. In some cases, cannabinoids could aggravate the conditions they are being used to treat, e.g., mental health conditions. In other cases, they could even cause harm, e.g., during pregnancy.

The harmful effects of cannabis are well documented, and include cognitive effects, addiction, mental health effects, cardiovascular

and respiratory effects, as well as road traffic accidents.<sup>4</sup>

Studies also show that adverse effects of medical cannabis are common. Most adverse effects are mild to moderate- Many patients report dizziness, dry mouth, nausea, fatigue, somnolence, diarrhea, and depression. Clinical trials of cannabinoids frequently report high drop-out rates due to unpleasant side-effects.<sup>5</sup>

In light of the well-documented risks of cannabis use and the sparse evidence for medical effects, there is good reason call for better studies and stronger documentation before expanding access to medical cannabis. However, it is also important to remove unnecessary obstacles to the scientific study of cannabinoid-based medicines.



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# **Long-Term Effects & Impairments Caused by Cannabis**



# Keynote Contribution: The World's Drug Policy Crisis

**Written by Dr Bertha K. Madras** *PhD (the honorable)*  
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## Introduction: we, the world are at a crossroads in drug policy

Come here today, at the Nordic Summit, to focus on marijuana, but cannot in good conscience, dismiss changing drug views, policies, laws that are the root of current changing views on marijuana.

Most pundits agree on the need to treat drug addiction, that addiction can be viewed as a public health issue. But drug policy views are entering a new phase, a dispute between those advocating unrestricted drug use and others supporting restricted access/use.

- At one end of spectrum, some in the harm reductionists community advocate for: de-stig-

matizing drug use, legalization of all drugs, commercialization coupled with “harm reduction” and criminal justice reform, continued drug use during treatment, drug use as a benefit, a source of comfort, pleasure, self-medication. “Why doesn’t research focus on the benefits of drug use?”, they ask. They advocate for removing legal restrictions on drugs as unrealistic and doomed to failure, rejecting restrictive drug policies, *blaming the “drug war” for addiction, the opioid overdose crisis*, mass incarceration, attributing drug use to social determinants - root causes of drug use are failed drug policies, families, stress, anxiety, trauma, homelessness, social injustices. This may be true in individuals, but many people suffer hardships at all levels and do not resort to drugs.

- They are skeptical, dismissive or even in denial of scientific evidence showing that drugs can be a root cause of many adverse consequences, physical, psychological behavioral, mental, or social. They believe it is irrational to prevent distribution of “clean drugs” to drug users, or irrational to imprison people for drug distribution. They refuse to acknowledge that easy access, normalization, and destigmatizing use are among the root causes of our current drug crises. They feint praise for prevention or acknowledge prevention with faint praise.
- ***It is worrisome that their voices are growing more aggressive and intrusive in the halls of policy makers. It is worrisome that these activists have recruited the very professionals who in the past objectively documented the harms associated with drug use: some physicians, scientists, academics – the very professions traditionally intolerant of drug use because of the consequences. More worrisome is that scientific evidence resides in the shadows during these debates, or is distorted to advance a culture of legalization.***

Those with conservative views on drug policy perceive drug use/addiction as a discretionary, voluntary activity with potentially severe burdens on the individual, on families, on nations. They support the involvement of criminal justice system to curtail supply. What is the reality?

Over the last 20 years the U.S. underwent a vast change in perception of drugs, resulting in changes in policies and drug laws. Three changes reversed many decades of progress:

1. a tenacious movement to legitimize any forms and any doses of marijuana as a medicine and as a legal recreational drug
2. unrestricted prescribing of opioids for any forms of pain under a broad range of medical circumstance
3. criminal justice reform at many levels of government, which translates into emboldening drug distributors.

The consequences of these changes are evident: Since 1999, 841,000 people have died from a drug overdose - equal to 14% of the entire population of Denmark or Norway, or 8% of Sweden's population. In 2020, 95,000 deaths were recorded. Many deaths are among homeless people, or among people living alone in hotel rooms or other units provided by city governments as harm reduction measures. Dealers in open air fentanyl markets are not arrested by police who witness deals. Yet this movement claims society has not been liberal enough: “if only a user can buy pure drugs at fixed doses, addiction and overdose deaths would disappear”. Arresting drug dealers evokes derision and designation as a “drug warrior”, a “fossil of the past”.

Some have good intentions. Political ideology and personal emotions or experiences with drugs are factors. Some believe they are the voice of ethics, of caring, fairness, liberty. Others have conflicts of interest rooted in personal and/or financial incentives: consultant fees, drug marketing, donations from billionaire activists or from drug distributors, or reimbursement as providers of addiction, housing, other services. ***They are not held accountable for the consequences of enabling a drug culture, a social experiment, that already has a track record of failure.***

And they dismiss people who harbor an alternative view - to reject drug use and addiction as a lifestyle choice, and to impede drug supply. These views are also rooted in ethics, in values of health, security, safety, responsibility. They are rooted in valuing the potential of each human brain and each life - as I do.

**With legalization and normalization, use will rise, especially among youth. What course will nations choose?**

- **a vast human experiment, with a pipeline of hundreds of psychoactive substances waiting to be marketed and without informed consent?**
- **or a return to judicious regulations and laws designed to protect the brains and minds of humans-the repository of our humanity.**



## Marijuana

The nexus between use of marijuana and other drugs is a critical factor in every policy debate.

Marijuana legalization is expanding, increasing the likelihood that people using this drug along with other drugs, will increase. The current state of marijuana policy is troubling because marijuana use carries a risk for addiction (higher for youth), is associated with impairment of intellectual function and increased risk of mental health problems including psychosis, depression, anxiety, and suicide. Many people suffer negative effects from the use of marijuana/THC. These negative health effects are documented.<sup>1</sup> The public and policy-makers need to learn the scientific evidence about the risks of marijuana/THC use and protect the health and safety of youth and other populations at risk. What are the major concerns?

**THC concentration in marijuana.** Currently marijuana contains more THC and less CBD, making it more harmful.<sup>2,3</sup> Highly concentrated marijuana/THC products available today can be up to 90% THC (the psychoactive part of marijuana). High potency marijuana with dramatic increases in THC:CBD ratios, in candies, cookies, sodas, and concentrates (e.g., budder, wax, honey oil, shatter) that can even be “vaped”, suggest that commercial marijuana is becoming an increasingly harmful product. Higher doses are associated with higher likelihood to cause addiction, and negative health consequences in early onset cannabis users. Use of high-potency cannabis was associated with increased frequency of cannabis use (>4.38), cannabis problems (>4.08), increased likelihood of anxiety disorder (> 1.92).<sup>5,6</sup> Problematic cannabis use typically peaks in adolescence, an age group that could be particularly vulnerable to its harmful effects. Cannabis markets dominated by high-potency cannabis and THC content steadily increasing worldwide. Compared with low-potency cannabis, high-potency cannabis appears to be associated with a greater risk of psychotic symptoms,<sup>7</sup> depression, anxiety, cannabis dependence, and adverse neuropsychological function such as disordered thinking and perception even in adults age 50 and older.<sup>8</sup> Adolescents only partially titrate their use of

high-potency cannabis, which can result in the consumption of high concentrations of THC. With cannabis policy rapidly changing, up-to-date evidence should inform decisions on potency taxes or potency thresholds, as well as define the legal age of purchase.<sup>9,10</sup>

**Marijuana can be addictive.** The earlier someone begins using marijuana, the higher their risk of addiction - one in six users (17%; 1 in 6) who start under age 18 become dependent and 25-50% of teen heavy users become addicted. Within 4 years of initiating marijuana use, 20% of 12–17-year-old adolescents develop a cannabis use disorder. Overall, research suggests that about 11% of people who start using marijuana develop an addiction.<sup>11</sup> Among youth receiving substance use disorder treatment, marijuana accounts for the largest percentage of admissions, about 55 % among 12 to 17 years old.

**Marijuana/THC use is associated with long-term negative consequences, particularly in adolescents and young adults <25 years old.**

**Impaired cognitive, intellectual development, motivation.** Marijuana use by adolescents can impair brain development, reduce academic success, impact long-term career growth, and even lower IQ. Marijuana use forecasted lower initiative and persistence, even after statistically ruling out 13 pertinent baseline covariates including demographics, personality traits, alcohol use, tobacco use, and self-efficacy subscales.

Cannabis users who begin regular use in their teens had poorer later life outcomes than non-using peers. By the mid-30s, both young-adult and adolescent-onset regular users were more likely than minimal/non-users (63.5%) to have used other illicit drugs (> 20.4), be a high-risk alcohol drinker (> 3.7), smoked daily (> 7.2) and less likely to be in relationships (OR < 0.4).<sup>12</sup>

**Increased risk of serious mental illness.** It is well documented that THC use can induce psychotic symptoms (cannabis-induced psychosis), paranoia, and panic attacks in some users. More recent research shows that frequent use and high



doses of THC are more likely to bring on acute psychosis.<sup>6,13,14</sup>

**Marijuana use increases the risk of developing serious psychotic disorders** including schizophrenia and bipolar disorder; this conversion occurs for approximately 47% of those with a cannabis-induced psychosis.<sup>15</sup> This is especially true for those who start using during adolescence, are heavy users of high THC products, and those at higher genetic risk for these disorders, but also possibly among those with no family history.

**Regular marijuana use has been linked to increased risk for several other mental health problems**, including depression, anxiety, suicidal thoughts, and personality disturbances. Additionally, studies show that high THC products may worsen PTSD and increase the risk of violence in the long-term.<sup>16</sup>

**Marijuana use during pregnancy may harm the developing fetus.** Research suggests that marijuana use during pregnancy may be linked to subtle neurological changes and, later in childhood, to reduced problem-solving skills, memory, and attention.<sup>17</sup>

**Where marijuana is legal, young people are more likely to use it.** States with legal medical and/or recreational marijuana laws, have the highest youth use rates in the U.S. States with more liberal policies have higher rates of youth use. Communities with the highest densities of dispensaries, have the highest rates of youth marijuana use. Since recreational marijuana was legalized in Colorado in 2013: Past month marijuana use for ages 12 and older increased 26% and is 61% higher than the national average, currently ranked 3rd in the nation. Past month adult marijuana use (ages 18 and older) increased 20% and is 62% higher than the national average, currently ranked 3rd in the nation. Past month college age marijuana (ages 18-25) use increased 10% and is 53% higher than the national average, currently ranked 3rd in the nation. Past month youth marijuana (ages 12-17) use decreased 22% and is 39% higher than the national average, currently ranked 7th in the nation. Further, recent re-

search shows an increased likelihood of cannabis initiation, and earlier initiation, among children whose parents used cannabis during their lifetimes; this indicates that adult use does impact youth use.<sup>18</sup>

**Legal states have seen an increase in marijuana-related emergency room visits after marijuana legalization.** In Colorado, a recent report showed an increasing rate of marijuana-related ER visits. Marijuana only exposures increased 185% from 2013 when recreational marijuana was legalized compared to 2020. The percent of suicide incidents in which toxicology results were positive for marijuana has increased from 14% in 2013 to 29% in 2020.<sup>19</sup>

**Increase in accidental marijuana use by young children.** According to data from the National Poison Data System, accidental exposure to marijuana among children under 6 years old has been on the rise. As more adults use marijuana infused products such as baked goods, gummy candies, candy bars and "cannabis cola" are often indistinguishable from traditional products and attractive to children, placing them at significant risk of accidental use.<sup>20</sup>

**Legal states have seen an increase in traffic deaths caused by operators testing positive for marijuana.** Since recreational marijuana was legalized in 2013, traffic deaths where drivers tested positive for marijuana increased 138% while all Colorado traffic deaths increased 29%. Since recreational marijuana was legalized, traffic deaths involving drivers who tested positive for marijuana more than doubled from 55 in 2013 to 131 people killed in 2020. Since recreational marijuana was legalized, the percentage of all Colorado traffic deaths involving drivers who tested positive for marijuana increased from 11% in 2013 to 20% in 2020.<sup>19</sup> Marijuana/THC impairs judgment and many other skills needed for safe driving: alertness, concentration, coordination, and reaction time. Marijuana use makes it difficult to judge distances and react to signals and sounds on the road. Marijuana is the most commonly identified illegal drug in deadly crashes, sometimes in combination with alcohol or other drugs. By it-

self, marijuana is thought to roughly double a driver's chances of being in a crash, and the combination of marijuana and even small amounts of alcohol is even more dangerous—more so than either substance alone.

We must apply the precautionary principle in public health: *the burden of proof for potentially*

*harmful actions by industry or government rests on the assurance of safety and that when there are threats of serious damage, scientific uncertainty must be resolved in favor of prevention.*<sup>2,15</sup>

### **Commercial Marijuana Regulations Do Not Prioritize Public Health and Prevention of Youth and Young Adult Access and Exposure**

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# Into the Weeds - with Science

**Written by Theiss Bendixen**

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**F**or thousands of years, cannabis has been part of human life. Hemp was likely one of the very first plants to be cultivated by humans. According to archaeological evidence, hemp served many purposes throughout history: In cooking and animal fodder. In production of clothes, ropes, and textiles. To achieve trance-like mental states in religious rituals and to establish contact with the gods. As a medical substance. Or just for fun.<sup>1</sup>

And so too up to our times. Today, *Cannabis sativa* is one of the most famous – and infamous – plant species. Cannabis is a source of fundamental political disagreement in many modern nation states: it is considered by some as a medical miracle cure... and by others as a root of evil with the potential to corrupt generations. Perhaps even more problematic, in recent years cannabis

has become interwoven with particular ideologies, identities, and worldviews. Often, conspiratorial notions obstruct constructive conversation across personal and social divides.

So how do we navigate the cannabis debate – or, rather, debates? Should we, for instance, embrace – and legalize – cannabis as a recreational or medical drug, simply on the grounds that historical societies made use of cannabis in its many shapes and forms? This is not an uncommon argument. But it is, I will argue, a fallacy. We cannot simply appeal to “ancient wisdom” when furnishing a modern society. Throughout history, humans have engaged in the most horrendous of traditions – human sacrifice, slavery, cannibalism, to mention but a few. That a cultural practice or tradition was historically prevalent does not – in itself – make it worth preserving.

<sup>1</sup> Parts of this white guide is translated and modified after: Bendixen, T. (2020). Hvor er videnskaben i cannabis-debatten? Foreword to: Schmitz, C. *Den vigtigste bog du nogensinde har læst om Cannabis*. Forlaget Historia.

Many similar fallacies and false starts hunt the cannabis debates today. So, instead of appealing to emotions, rational thinking is called for. Weighing risks and benefits objectively and systematically. Isolating pros and cons. Weeding out myths and misconceptions. With science<sup>1</sup>.

In my talk, “Into the weeds – with science”, I touched upon the following:

- Weeding out fallacies: The problem with appeals to tradition and ancient wisdom and similar false starts.
- “What they are not telling you”: The connection between cannabis and conspiracy thinking.
- How *not* to do policy on medical cannabis: The Danish case
- The solution? Science- and evidence-based debate and policy. When we survey the best available scientific evidence,<sup>2</sup> we find that cannabis has medical potential but that it is not a panacea and that the benefits and risks of cannabis must be evaluated on line with other proven medical alternatives.<sup>3</sup>
- We should, first and foremost, keep debates about recreational drug use and medical cannabis separate; in many ways, they are orthogonal discussions, but they are often confounded in public discourse. Here, I focused mainly on the medical use of cannabis.

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# Cannabis Effects on Cognitive Function

**Written by Dr Madeline H. Meier**

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Cannabis intoxication results in temporary cognitive impairment, but it is less clear if cannabis use results in enduring cognitive impairment – an impairment that persists beyond the period of acute intoxication.<sup>1,2</sup> Studies comparing heavy cannabis users with nonusers have collectively shown that heavy cannabis users, even when not intoxicated by cannabis, perform worse on cognitive tests, including tests of learning and memory, attention, and other executive functions.<sup>3-6</sup> The magnitude of cognitive deficits in these heavy cannabis users is small,<sup>3-6</sup> though some evidence suggests that cognitive deficits may be larger among more frequent, chronic, and earlier-onset cannabis users.<sup>7-13</sup> Some evidence suggests that cognitive deficits may resolve with prolonged abstinence.<sup>4,5,14,15</sup>

The extant evidence base draws largely on

studies that compared heavy cannabis users with nonusers on cognitive test performance, and these studies have two commonly cited limitations. First, the studies lack information on initial cognitive functioning before the onset of cannabis. Therefore, the studies do not address the possibility that cognitive differences between cannabis users and comparison individuals represent pre-existing rather than cannabis-induced deficits. Second, the studies rely on cannabis users' retrospective reports of their frequency, quantity, age-of-onset, and duration of cannabis use, with reports often obtained years after initiation of heavy use. Retrospective reports of cannabis use might not be accurate.

To redress these limitations, prospective longitudinal studies are needed. Prospective longitudinal studies assess cognitive functioning in youth



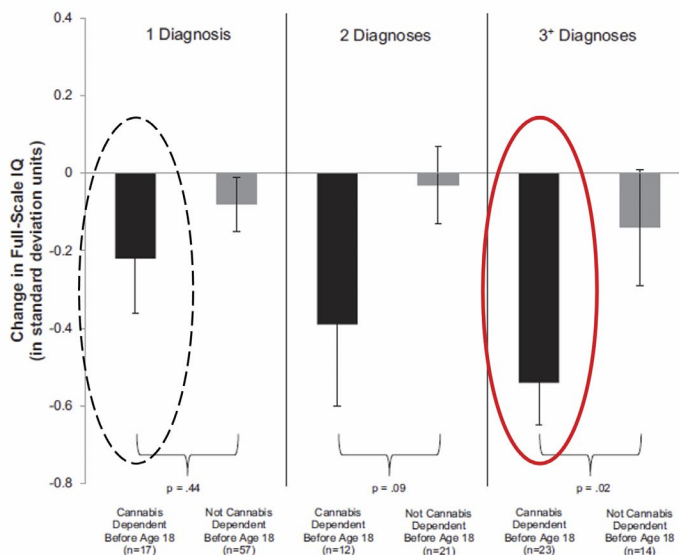
before the initiation of cannabis use, obtain prospective information about cannabis use as the sample is followed over a number of years, and then reassess cognitive functioning again, after some individuals in the sample have developed a persistent pattern of cannabis use. The most comprehensive prospective longitudinal study of cannabis use and cognitive functioning was published by our group in 2012.<sup>16</sup> Our study found that persistent cannabis use was associated with IQ decline from childhood to adulthood, and IQ decline was concentrated in adolescent-onset persistent cannabis users. The 2012 study and its findings are summarized below.

### Cannabis and IQ (Discussion of Meier et al., 2012)

The study examined the association between persistent cannabis use and IQ decline and tested whether IQ decline was concentrated among adolescent-onset cannabis users. Data came from the Dunedin Multidisciplinary Health and Development Study. The Study has followed a group of 1,037 children, who were born in 1972-73 in Dunedin, New Zealand, from birth to age 38 years, with 96% of the sample taking part at age 38. IQ was tested at age 13, before cannabis use, and again at age 38, after some study members had used cannabis for years.

Results showed that:

1. Persistent cannabis use was associated with IQ decline from childhood to adulthood, and IQ decline was concentrated among adolescent-onset persistent cannabis users. For example, individuals who began using cannabis in adolescence (before age 18) and used it for years thereafter showed an average 8-point IQ decline from childhood to adulthood (circled in red in the figure). Individuals who used cannabis short-term in adolescence showed only weak evidence of IQ decline (3-point IQ decline; circled in black dashes in the figure). Individuals who began using cannabis in adulthood (after age 18) did not show IQ decline (gray bars), even when they used persistently. In the figure below, 1 diagnosis = the study member met criteria for cannabis dependence at only one of the five longitudinal assessment phases (ages 18, 21, 26, 32, 38 years); 2 diagnoses = the study member met criteria for cannabis dependence at two of the five assessment phases.; 3+ diagnoses = the study member met criteria for cannabis dependence at three or more of the five assessment phases. More diagnoses = greater persistence.



Adolescent vulnerability. Shown is change in full-scale IQ (in SD units) from childhood to adulthood among study members with 1, 2, or 3+ diagnoses of cannabis dependence as a function of age of onset of cannabis dependence. Individuals with adolescent-onset cannabis dependence (black bars) experienced greater IQ decline than individuals with adult-onset cannabis dependence (gray bars). IQ decline of approximately  $-0.55$  SD units among individuals with adolescent-onset cannabis dependence in the 3+ group represents a decline of 8 IQ points. Error bars = SEs.

2. Quitting or reducing cannabis use did not appear to fully restore intellectual functioning among adolescent-onset former persistent cannabis users.
3. IQ decline could not be explained by alcohol or other drug use or by reduced years of education among persistent cannabis users.
4. IQ decline could also not be explained by low childhood socioeconomic status or poor childhood self-regulation.<sup>17</sup>
5. Third-party informants (e.g., friends, relatives) reported noticing more attention and memory problems in everyday life among persistent cannabis users (e.g., losing focus when they should be paying attention, forgetting to do errands, return calls, pay bills).

### Why are these findings important?

*The importance of “before and after” IQ testing.* Previous studies have suggested that adolescents may be particularly vulnerable to the effects of cannabis on cognitive functioning.<sup>8-10,18-20</sup> However, research had not been able to rule out the possibility that poorer cognitive test performance among adolescent-onset cannabis users predates cannabis-use initiation. Results of Meier et al. (2012) showed that, regardless of their initial (pre-cannabis) test performance, adolescent-onset persistent cannabis users performed worse than non-users and adult-onset cannabis users on cognitive tests in adulthood.

*What is the size of the IQ decline?* The extent of IQ decline among adolescent-onset persistent cannabis users (8 IQ points) is non-trivial. For example, an average person has an IQ of 100, placing them in the 50th percentile for intelligence compared to their same-age peers. If this average person loses 8 IQ points, they drop from the 50th to the 29th percentile for intelligence.

*Why is an 8-point decline in IQ significant?* Research has shown that IQ is a strong predictor of a person's access to a college education, their lifelong total income, their access to a good job, their performance on the job, and even early death.<sup>21,22</sup> Individuals who lose 8 points may be disadvantaged, relative to their same-age peers, in many important aspects of life. In fact, the adolescent-onset persistent cannabis users from the Dunedin Study experienced downward social mobility. That is, they ended up in occupations that were less prestigious, less skilled, and less well paid than their parents' occupation.<sup>23</sup>

*How many people does this affect?* Only approximately 2% of the 1,037 individuals born in one year in Dunedin became adolescent-onset persistent cannabis users. Thus, any effect of cannabis on IQ is confined to a relatively small segment of the population. Nonetheless, findings are concerning given that fewer adolescents today believe that regular cannabis use presents a serious health risk.<sup>24</sup>

*What should we do?* We should direct efforts toward delaying the onset of cannabis use in young people and encourage cessation, particularly for cannabis users who began using in adolescence.

### What additional research is needed?

1. *What are the mechanisms underlying cannabis-related IQ decline?*
2. *What are the parameters of cannabis use that determine the magnitude and persistence of cognitive deficits?*
3. *Does cognitive functioning recover with prolonged abstinence?*
4. *Are there individual differences in susceptibility to cannabis-related cognitive deficits?*



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# Cannabis: Developmental & Cognitive Perspectives in Youth

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## Background

Cannabis use is the most used illicit substance by young people worldwide. Cannabis use in youth is a growing phenomenon on foot of changing social norms around its perceived harmfulness. Policies that increase cannabis access across jurisdictions are associated with increased use and increased harmful use in young people. There is notable lag time of 5 years between policies that increase cannabis access and increases in youth use of cannabis, this lag time effect may obscure the damaging effects of legal commercial cannabis markets.<sup>1,2</sup> This lag needs to be contextualized within pre-legislative secular declines in risk behaviours in young people generally; cannabis legalization, and particularly commercialization, is likely to reverse those public health gains.<sup>1</sup>

A focus on youth substance use in the context of policies that increase cannabis access is necessary. Youth represents a transitional phase in life where personal freedoms and responsibilities change rapidly. Legally young people reach the age of majority at 18 in most western countries. This is in tandem with rapid successive changes in a young person's social environment as they transition to independent adulthood. Common milestones in young people's lives include entering (and exiting) significant romantic relationships; moving out of home; establishing life skills for independent living; entering and exiting training, college & workplaces.<sup>3</sup>

Youth is also a period in life in which the incidence of mental disorders and suicide rapidly increase. Mental disorders account for the largest burden of disease in young people. In industrial-

ized countries in particular, mental disorders account for the majority of disease burden dwarfing other causes of disease burden.<sup>4</sup> Statutory services and public health policy, in terms of organization, funding and governance, rarely reflect these realities<sup>5</sup>. Changes in the social environment in young people, and accrual of adult rights and responsibilities at the age of 18, are not reflective of more gradual transitions to cognitive and biological maturity. Brain development, particularly that of the prefrontal cortex, notably implicated in higher-level cognitive skills, is unlikely to be completed until the mid to late twenties.<sup>6</sup>

The endocannabinoid signaling system is strongly implicated in neurodevelopmental processes during youth and neural plasticity, particularly in the prefrontal cortex in adolescence.<sup>7,8</sup> During adolescence endocannabinoid receptors are much more highly abundant than in adulthood and gradually downregulate in tandem with the emergence of normative synaptic pruning of the prefrontal cortex. Animal studies show enhanced synaptic pruning and an excess reduction in dendritic arborization in the context of exogenous endocannabinoid administration in adolescence.<sup>9-11</sup> Concurrently, the largest longitudinal magnetic resonance imaging study to date shows enhanced age-related cortical thinning in the prefrontal cortex associated with exogenous endocannabinoids in adolescence, in a dose-response pattern.<sup>12</sup> Cannabis has previously been shown to be associated with several volumetric differences in areas rich in cannabinoid receptors previously also.<sup>13</sup> Even very low amounts of cannabis use in adolescence have been shown to be associated with differential brain development in adolescents.<sup>12,14</sup>

### **Our study**

Our most recent study on the effects of cannabis use in youth shows an association with between frequent cannabis use and decline of global intelligence.<sup>15</sup> This meta-analysis was the largest longitudinal study examining changes in intelligence quotient associated with the onset of frequent cannabis use in the literature to date to our knowledge. We were specifically interested in investigating those youth whom had used cannabis frequently rather than those whom may have

used experimentally. However, we set a relatively high threshold for frequency of use, which we defined as reporting a minimum of weekly use over 6 months or more than 25 lifetime uses. We chose this threshold as self-reports of very low levels of use of cannabis may be unreliable and approximately 1 in 3 young people who use cannabis at and above this threshold develop cannabis dependency according to previous research.<sup>16,17</sup> We found modest but statistically significant and homogenous declines in intelligence quotient scores equating to an approximate 2-point decline in IQ scores in the frequent users' group versus a no use and experimental use control group. In subsequent further analysis, this effect seemed to be driven by declines in verbal IQ. This corresponds with IQ changes in adolescence prior to the onset of later schizophrenia, as shown by McCabe and colleagues previously. Of note we found no evidence of baseline differences in IQ prior to cannabis use onset between those young people whom use cannabis frequently versus the control group.

The strengths of this study include the large sample sizes. Many previous studies on adolescent cannabis use have been significantly affected by numerous methodological issues including lack of longitudinal follow up, small sample sizes, and capturing youth with relatively low cannabis use patterns. The need for researchers to engage and retain young people with high levels of cannabis use in research studies is important as frequent, and especially daily use, increases with cannabis legalization trends. Many analyses, particularly discordant twin analyses, are underpowered to capture effects of non-daily use. Furthermore, there is a need to capture biological samples in studies of youth cannabis use to monitor for effects of intoxication during testing. Investigating whether cannabis use has long term effects beyond residual intoxication is of particular importance. Most studies to date rely on self-reported use and this has limitations. Further studies of cannabis use in youth should plan longer periods of follow up and improve efforts to retain at-risk young people in studies. Many studies we identified in our meta-analysis had limited periods of follow up that may not capture the developmental period in its entirety. Many of the studies included in our meta-

analysis had high drop-out rates, except for one study described by Meier et al. (2012) which found clinically significant declines in IQ in adolescents with adolescent onset heavy cannabis use.<sup>18</sup> Future research should also examine whether differential drop out occurs in substance use research in young people, and in particular, to what extent do youth who use cannabis heavily drop out from such studies, as this has particular importance in understanding the available literature to date. It is highly likely that youth whom use cannabis heavily are more likely to drop out from longitudinal studies for a variety of reasons such as the amotivational effects of cannabis.

### Discussion and recommendations

Policies focused on substance use must account for the needs of young people and their health and wellbeing. The transition to established adulthood is arguably becoming harder for young people in the context of the changing labour market, increasing costs of living and stagnant wages. Providing effective preventative healthcare policies for young people has never been more important as industrialized society's age, dependency ratios increase and inequality grows.<sup>19</sup> Climate change is also a major concern for young people and cannabis cultivation is a large source of CO<sup>2</sup> emissions.<sup>20,21</sup> An increasingly risky social environment, misinformation, and limited quality research about the risks of cannabis use will compound the challenges young people face in modern society. Whilst arguments for substance use policy changes which increase accessibility increasingly focus on equity, that appears to be the opposite to what substance use

policy changes has actually delivered.<sup>11,22-24</sup> Namely to date, policies that increase cannabis access have failed to reduce illicit markets but rather has increased hazardous substance use in young people, healthcare costs, and available substance potency.<sup>25-27</sup> An increasing focus on high quality evidence, as well as implementation of effective and evidence-based prevention and harm reduction strategies needs to be a priority. Moreover, what is missing from policy formulation and research processes are the voices of young people who have been adversely affected by hazardous cannabis use. These stigmatized young people are silent in the debate on policy change whilst commercial interests are free to advocate their agendas to policy makers.<sup>28,29</sup> The healthcare and research communities could improve the situation immediately by two actions. Firstly, they must also defend their integrity, and reclaim the narrative on cannabis and public health by not allowing the misnomer of "medical cannabis" to proliferate.<sup>30,31</sup> The evidence base on the effectiveness of cannabis for most common indications is very poor, with most well conducted studies showing very little benefit in almost all the conditions it is commonly prescribed for. In contrast, the harms associated with various forms of use are well described and of particular concern is suicidality, depression, cannabis dependence, educational failure & psychosis in young people.<sup>21,32-38</sup> Secondly, to facilitate direct advocacy by those affected by problem cannabis use. Young people adversely & disproportionately affected by the growing trends in the population of harmful use of cannabis must have their voices at the centre of any equitable policy debate.<sup>39,40</sup>

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# Cannabis, Schizophrenia & Other Psychoses: What is the Evidence?

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## **Evidence**

It has since long been known that cannabis can cause various mental symptoms, including anxiety, delirium, and psychotic states.<sup>1,2</sup> The probably most discussed effect is psychotic symptoms, generally of short duration. The terminology, as well as clinical characteristics, have varied: brief psychosis, toxic psychosis, cannabis psychosis, etc. To what extent cannabis use can

cause chronic psychosis, and in particular, schizophrenia, has been more controversial and difficult to assess. The main problem has been the difficulty to identify a significant number of cannabis users and non-users, which are followed enough time to assess the occurrence of chronic psychosis. Several years ago, we published a study of 50 000 Swedish conscripts, with reported levels of drug use and many other characteristics in youth, whom we could follow up in health care registers

regarding the incidence of schizophrenia.<sup>3</sup> We found that subjects with the highest level of cannabis use had an almost threefold increased risk of schizophrenia at 14 years follow-up, even when we controlled for various background factors and previous mental problems that could confound the association. Additional follow-ups of the same cohort, with more thorough analyses, confirmed findings of increased risk of schizophrenia among those who reported cannabis use in their youth.<sup>4</sup>

By that time, other longitudinal studies were published. In 2007, Moore et al.<sup>5</sup> summarised the evidence from six longitudinal studies in five different countries. Most studies did not have the power to assess specific schizophrenia as an outcome, but rather schizophrenia spectrum disorders or chronic psychoses. It should be noted that these are very different from the brief psychoses often associated with cannabis use. The summary finding was a more than doubled increased risk (odds ratio 2,1 with a confidence interval of 1,5-2,8) among high consumers of cannabis compared to non-users.

Ten years later, Marconi et al. identified a few more studies to add in a meta-analysis, where the risk of chronic psychosis concerning the level of cannabis use was also assessed.<sup>6</sup> All studies showed a clear dose-response association, i.e. higher risk of psychosis by a higher level of cannabis use. They found an overall fourfold risk of psychosis among the heaviest users and a twofold increased risk among average cannabis users. The studies were designed to exclude persons with psychotic symptoms before enrolment, to avoid "reverse causation". It is also necessary to understand that cannabis use hardly ever is the only cause of schizophrenia or other psychoses. These disorders are in general developed through various determinants, e.g. a genetic vulnerability or perinatal trauma. Yet, cannabis use can be one part of a chain of events. This implies that, on the population level, a number of cases of psychosis would not have occurred if cannabis use had been avoided. Based on UK consumption levels among youth, Moore et al.<sup>5</sup> estimated that around 14% of cases of psychosis could have been avoided if there had been no cannabis use.

A question that remained unanswered was whether the increased risk was reflected in an increased occurrence of schizophrenia or other psychoses in countries and regions where cannabis use was more frequent. In general, this is methodologically difficult to assess also, since it demands both accurate information on cannabis use in the population and accurate information on psychosis incidence. Few studies have attempted to answer this question, and the strongest evidence is from a multi-center study by Di Forti et al.<sup>7</sup> They assessed the incidence of psychotic disorders in 11 locations in Europe and compared the level of cannabis use and the potency of typical cannabis products in the same locations. They found that cities with higher levels of use and higher potency of cannabis, such as London, Amsterdam, and Paris, also had a high incidence of psychosis. Additional evidence for the effects of cannabis use on the incidence of schizophrenia was given recently by Hjorthoj et al.<sup>8</sup> They used the Danish National Health Care registers to assess the incidence of the specific diagnosis of schizophrenia over time while also identifying whether subjects with schizophrenia had a treatment record of cannabis use disorder. They found that the population attributable fraction, i.e. the proportion of cases attributable to cannabis use, increased over time. There was also an increased incidence of schizophrenia over time, which could partly be explained by the increasing use and potency of cannabis.

Thus, from being a controversial issue, several official documents listing health effects of cannabis, now include increased risk of schizophrenia and other chronic psychoses as established health hazards of cannabis use.<sup>9,10</sup>

### **Legalization**

With legalization, it will not only be easier to access the drug. The main problem is that there are market forces with the main interest to increase drug use. There are already signs that localities with a higher level of usage have a higher occurrence of psychosis, so an increase in mental health problems, including chronic psychoses and schizophrenia, which would be a serious consequence of increasing use.



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# Impaired Driving - the Public Safety Threat of Cannabis & Other Drug Use by Drivers

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**D**rug-impaired driving is a threat to public safety on par with the better-known problem of alcohol-impaired driving, and is dangerous, costly, and potentially lethal. Cannabis is the most widely used drug by drivers other than alcohol. Delta-9-tetrahydrocannabinol, or THC, is the primary psychoactive component of cannabis. THC is consumed via smoking, inhaling vapor, and by ingesting edibles. The average THC content in cannabis plant material has increased for several decades, and the recent development of THC extracts now can deliver extremely large amounts of THC to users.<sup>2</sup>

## **Cannabis impairs the skills needed to drive safely**

Areas adversely affected by cannabis include but are not limited to: [e.g., see <sup>2,3</sup>]

- Cognitive and psychomotor functions
- Risk-taking behavior
- Reaction time
- Short-term memory
- Motor skills
- Tracking
- Focused, divided, and sustained attention
- Standard Deviation of Lane Position (SDLP) or weaving of the car

Importantly, impairment resulting from drug use, including THC, can vary from person to person based on tolerance as well as drug-to-drug and drug-to-alcohol interactions;<sup>4</sup> for example, the impairing effects of THC and alcohol are additive.<sup>5</sup> Overall, an estimated 20-30% of crashes involving cannabis occur directly due to cannabis use.<sup>6,7</sup>

**Cannabis is the most widely used drug (other than alcohol) among drivers**

Estimates of drugged driving come from studies of self-reported data, and the toxicological results of drivers arrested for impairment, as well as seriously and fatally injured crash victims.

- In 2019, 12.8 million drivers aged 16 and older in the U.S. self-reported driving under the influence of cannabis in the past year<sup>8</sup>. Notably, the highest prevalence of cannabis-impaired driving was among young drivers aged 21-25 (12.3%), followed by the youngest drivers aged 16-20 (10.5%).
- The U.S. National Roadside Survey, last conducted in 2013-2014, found that, among weekend nighttime drivers, 22.5% were positive for drugs other than alcohol and 12.6% were positive for THC.<sup>9</sup>

- The incidence of drug-impaired driving increased in the U.S. during the COVID-19 pandemic.<sup>10</sup> A 2019-2020 study showed the prevalence of active THC detected in blood among seriously and fatally injured drivers increased from 20.8% before the pandemic to 32.7% and 26.1%, respectively, during two pandemic periods in 2020.<sup>10-12</sup> See Table 1.

**The drugged driving problem is not limited to cannabis; polysubstance use is common**

The consumption of two or more impairing substances is of significant concern because it can lead to an increase in impairment and relative crash risk. The increase can be additive or, in some instances, multiplicative or synergistic. For example, the European Union Driving Under the Influence of Drugs, Alcohol and Medicines (DRUID) study found the use of multiple drugs can produce a “highly increased crash risk” and the combination of alcohol and drugs can produce an “extremely increased crash risk” whereby an individual is up to 200 times more likely to be involved in a crash.<sup>13</sup> A growing body of research shows how common polysubstance use is among drivers, with the combination of alcohol and cannabis most common.

Table 1. Seriously and fatally injured drives positive for drug category

Drug Category	Before Pandemic (N=1,157)		During Pandemic Study Period 1 (N=699)		During Pandemic Study Period 2 (N=640)	
	n	%	n	%	n	%
Alcohol	252	21.8	198	28.3 <sup>A</sup>	187	29.2 <sup>A</sup>
Cannabinoids†	241	20.8	227	32.7 <sup>A</sup>	167	26.1 <sup>A, B</sup>
Stimulants	106	9.2	64	9.2	69	10.8
Sedatives	93	8.0	61	8.7	50	7.8
Opioids	87	7.5	97	13.9 <sup>A</sup>	86	13.4 <sup>A</sup>
Antidepressants	26	2.2	3	0.4 <sup>A</sup>	6	0.9
Over-the-Counter	25	2.2	10	1.4	8	1.3
Other Drugs	17	1.5	15	2.1	22	3.4 <sup>A</sup>
At Least 1 Category	588	50.8	452	64.7 <sup>A</sup>	394	61.6 <sup>A</sup>
Multiple Categories	204	17.6	177	25.3 <sup>A</sup>	158	24.7 <sup>A</sup>

† Active THC (Δ-9-THC or 11-OH-THC)

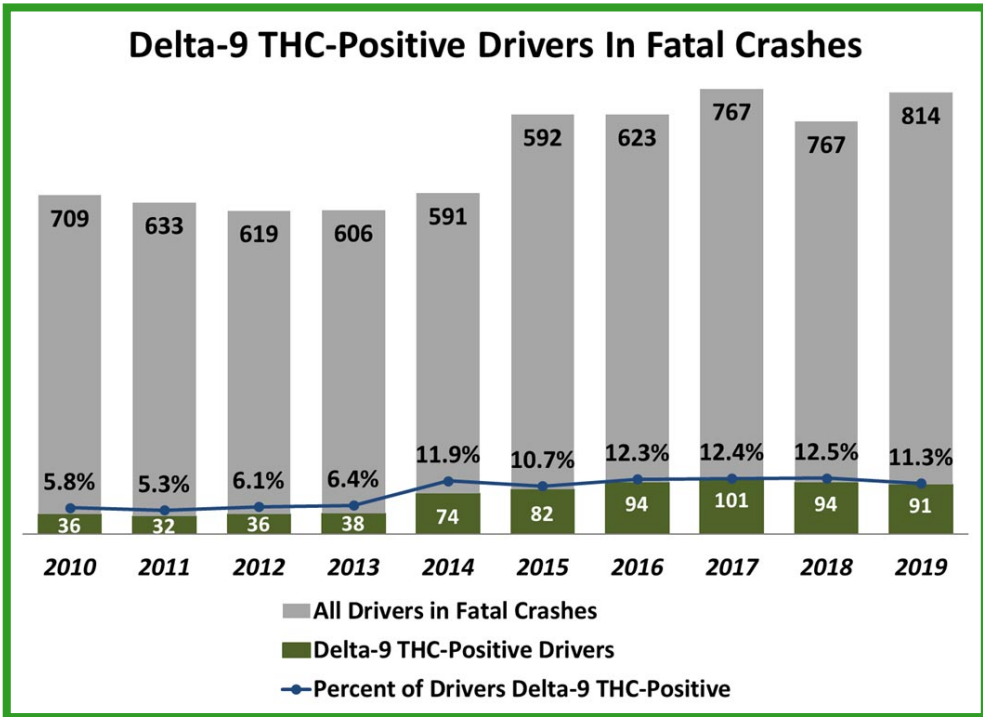
<sup>A</sup> Significantly different from “Before” period, p<0.5

<sup>B</sup> Significantly different than “During 1” period, p<.05

During 1 = 03/17/20 – 07/18/20

During 2 = 07/19/20 – 09/30/20

Figure 1. Delta-9 THC-Positive Drivers in Fatal Crashes in Washington State



- Data from Washington, one of the first states in the U.S. to legalize recreational cannabis, show that the percentage of fatally injured drivers positive for THC increased dramatically in 2014 and remained steady at around 12% through 2019, though testing rates declined during that time.<sup>14</sup> See Figure 1. More than half (53.7%) of all THC-positive fatally injured drivers were also positive for alcohol.
- Colorado, which commercialized cannabis for medical uses in 2009 and then legalized recreational cannabis use in 2013, has shown increases in the percentage of drivers involved in fatal crashes testing positive for THC.<sup>15</sup> See Figure 2.

**There is no impairment threshold for cannabis (THC) or any other drug**

Unlike alcohol, cannabis (THC) and other drug levels do not consistently correlate with specific levels of impairment. As alcohol is consumed, an individual’s blood alcohol concentration (BAC) increases, and so does impairment.<sup>16</sup> See Figure 3, After smoking cannabis, the THC concentration in blood peaks quickly and begins to drop very soon after; however, impairment is longer lasting.<sup>16</sup>

As a result, there will never be an impairment threshold for cannabis or *any other drug*.<sup>17,18</sup> The U.S. National Safety Council stated that, “due to rapid changes in blood THC concentrations over time, there is no minimum safe threshold blood

Figure 2. Percent of All Traffic Deaths where a Driver Tested Positive for THC in Colorado

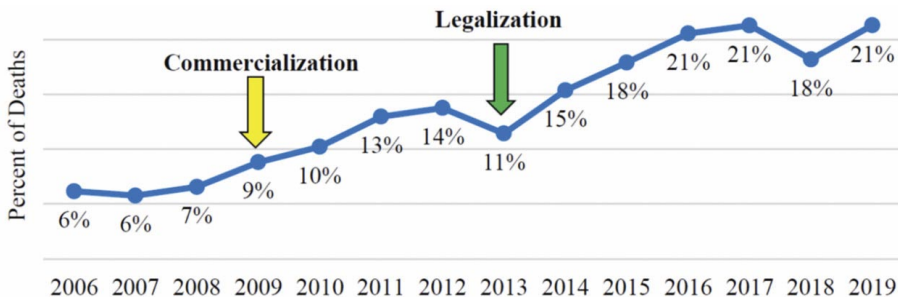
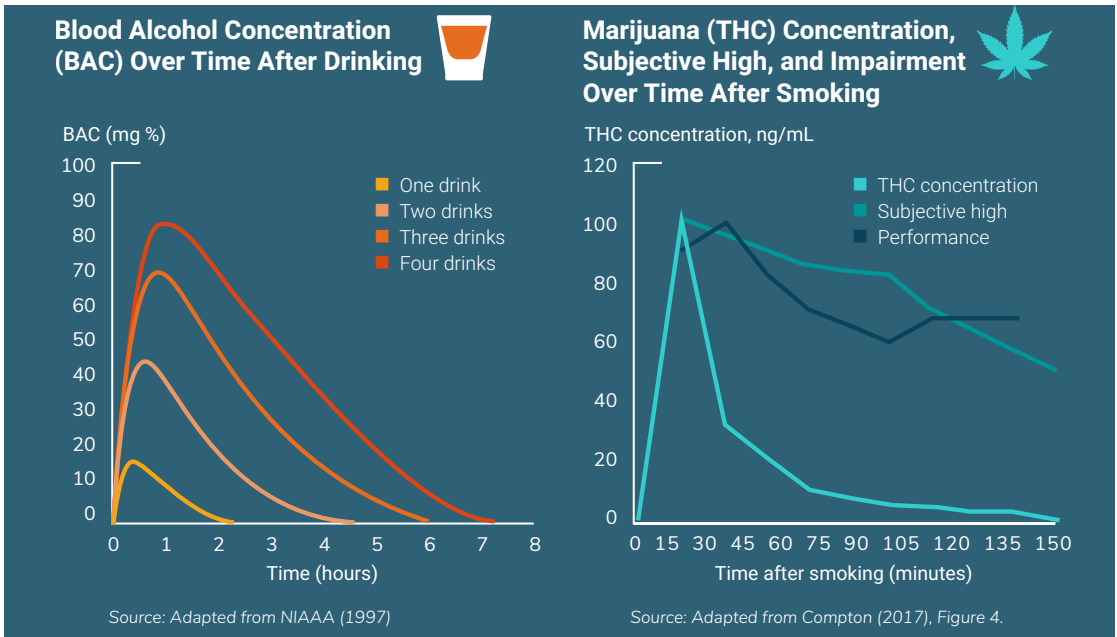


Figure 3. Source: GHSA and Responsibility.org, 2018



concentration below which a driver can be considered to have been unaffected while driving following recent cannabis use.”<sup>19</sup>

**Drug testing technology must be used in impaired driving enforcement, and to inform future policy**

Reliable oral fluid drug testing technology can be used at the roadside to screen impaired driving suspects for drugs in addition to the preliminary alcohol breath tests that are currently used.<sup>20-22</sup> A growing number of countries are implementing roadside drug testing programs to identify and remove drug-impaired drivers from the roads. The use of oral fluid testing for evidentiary purposes is being explored as sample collection is less invasive than a blood draw and can be collected proximal to the time of a traffic stop. Unlike oral fluid screening which produces preliminary results, an evidential sample can be submitted to a forensic laboratory for confirmation testing. As more states in the U.S. and other nations move towards the commercial legalization of cannabis (and potentially other drugs), they should collect

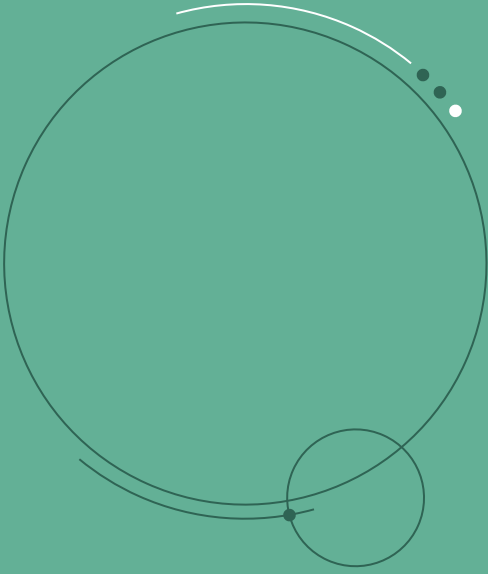
baseline data on drug-impaired driving, beginning with testing fatally and seriously injured drivers for drugs.

**Clear, accurate, and balanced public messaging on drug driving is needed**

Drug-impaired driving contributes to motor vehicle crashes that result in injuries and deaths and translates to significant economic costs to society, and personal costs to families. Targeted, culturally relevant education messaging is needed to inform the public, and in particular, young drivers, on the dangers of drug driving. Several states that have commercialized recreational marijuana use have created cannabis-impaired driving education campaigns.<sup>23-25</sup> “Don’t drink and drive” is a public safety message that is near-universally accepted. We need an equivalent, clear message of “Don’t drug and drive” with the explicit knowledge that all efforts to identify and reduce drug-impaired driving support and complement—and do not compete with—efforts to reduce alcohol-impaired driving.

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# **Legalization Trends & Responses**





# Prevention of Cannabis Related Harm Amongst Adolescents - Parents & the Wider Policy Context

**Written by Dr Bobby P. Smyth**

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## **Background**

**W**hile cannabis is not the most dangerous drug for individual adolescents, it certainly can cause harms.<sup>1,2</sup> Given the fact that it is the most widely used illegal drug, those harms are very substantial across the adolescent population. Indeed, the Global Burden of Disease study indicates that no individual illegal drug is causing more morbidity and impairment to 15–19-year-olds worldwide than cannabis.<sup>3</sup> While it is the heaviest users who are most likely to experience problems,<sup>1,4</sup> harm can occur to infrequent users related to intoxication and there is growing evidence of potential neu-

robiological impacts with lower-level use during early adolescence.<sup>5,6</sup>

## **Parenting**

While there are a wide range of influences upon adolescents, including peers, school, neighbourhood, media, culture, and legislative, there is probably no individual influence greater than that of parents. Consequently, parenting practices can significantly impact an adolescent's likelihood of progressing down the path of cannabis use, or not.<sup>7,8</sup> Many of the general parenting approaches used in alcohol prevention seem equally applicable to prevention of cannabis and other drug problems.<sup>8,9</sup>



Research endorses an authoritative style of parenting, an approach which is characterised by a high level of responsiveness (i.e., empathy, affection, good communication) while simultaneously demonstrating what Diana Baumrind described as “demandingness” in her seminal research from the 1960s.<sup>9-12</sup> Demandingness includes the maintenance of expectations around behaviour, monitoring of adherence to those expectations and issuing consequences where behaviour falls short of the expected standard.

While much scientific literature focuses on risk factors, a group of researchers in USA have assembled a useful list of protective factors which correlate with better outcomes for adolescents across multiple domains including substance use.<sup>13,14</sup> These are referred to as developmental assets. Many of these assets are under direct or indirect parental influence. The list of the 40 developmental assets constitutes a useful, intuitive and accessible resource for parents and those involved in prevention work - see:

<https://www.search-institute.org/our-research/development-assets/developmental-assets-framework/>.

One of the most exciting developments in the domain of primary prevention in recent decades has been the Planet Youth model from Iceland, although some question if its benefits are overstated.<sup>15-17</sup> The demonstrated outcomes in Iceland are very impressive.<sup>18</sup> Efforts are now underway to see if this model will successfully translate to other cultural settings.<sup>17,19,20</sup> Many of the recommendations and actions which arose from this model in Iceland have been parent focused. Summarising these, efforts have been made to ensure that (a) parents provide increased scaffolding around teenagers and (b) adolescents remain integrated into ongoing family life in spite of their growing independence. The Assets based approach and the Planet Youth model are entirely consistent with the advice regarding authoritative parenting mentioned earlier.

There are also some substance specific aspects to consider in parenting. Greater cannabis use by a parent increases the likelihood that their child will use cannabis.<sup>9,21,22</sup> Passive or active permission by parents to use alcohol or cannabis seems to be as-

sociated with increased use and increased harms.<sup>7</sup> There is some research which indicates that a specific household rule which makes it clear that cannabis use is not permitted can be helpful.<sup>22</sup>

In addition to the important role of family in prevention, there is also very good evidence highlighting the value of family involvement in the treatment of adolescent substance use disorders.<sup>23-26</sup>

### **Wider society & legalization**

Parenting does not occur in a vacuum. It operates within a wider cultural and social context.<sup>27</sup> Therefore, the legislative and policy aspects of cannabis at a government level have the potential to make parents’ task easier or more difficult.

The cannabis legalization movement focuses very strongly on so-called “medical cannabis”. Building a narrative around “medical cannabis” allows the cannabis industry and the legalization movement to frame cannabis as a safe and harmless substance.<sup>28</sup> Although there is indeed exciting evidence that cannabidiol can have a profoundly positive treatment response in some children with Dravets Syndrome,<sup>29</sup> this should not mean that the parent plant is referred to as a medicine.<sup>30</sup> While the cannabis industry seeks to frame its product as a medicine it is not subject to any of the regulations which face the producers of real, approved medicines.<sup>31</sup>

The discourse around “medical cannabis” serves industry interests by softening public opinion, confusing parents and causing young people to underestimate cannabis harms.<sup>32,33</sup> There is a well-established inverse relationship between perceived risk of cannabis use and actual use.<sup>32,34</sup>

### *“Medical Cannabis” as Trojan Horse route to full legalization*

Canada is the perfect exemplar of the full operation of the “medical cannabis” to full legalization model. Around 2001, legalization was passed on compassionate grounds permitting use of some cannabis products for specified conditions but limited to prescribing by medical specialists. There was a prolonged series of legal and political challenges which slowly increased the number of eli-

gible conditions and reduced the role of specialists. As far back as 2010, a network of over 100 “medical” cannabis dispensaries operated in the city of Vancouver alone (population 2.5 million) in a tolerated “grey market”, constituting de facto legalization.

Against this backdrop, there is little reason to expect that the formal legalization for adult use in 2018 will have much impact on access, availability and normalization of youth cannabis use. In California, there was also a loosely regulated “medical cannabis” network of dispensaries prior to “recreational” legalization. Humphreys describes such models of “medical cannabis” provision as an “aggressively commercialization, quasi-recreational cannabis industry”.<sup>35</sup> The vice-president of the Canadian Medical Association called for the “medical cannabis” system to be dismantled following legalization and was uneasy about the ongoing role of doctors as “gatekeepers” to consumer access.<sup>36</sup>

It has been widely stated that the legalization of cannabis events in North America have not been associated with increased use by adolescents.<sup>37</sup> These analyses completely ignore the reality that legalization is a 10–20 year slow and incremental process, which starts with “medical cannabis”. It is inappropriate to explore impact as though it is a single discreet event, while ignoring the escalating policy liberalization with de facto legalization preceding it.<sup>38</sup>

It is universally agreed that daily cannabis use by people in mid-adolescents is a particular high-risk activity.<sup>4</sup> The Monitoring the Future (MtF) survey of 10th grade students (16 years old) in USA commenced in the early 1990s, prior to “medical cannabis” availability in any State.<sup>39</sup> At that time, 0.8% of the students reported daily cannabis use. The latest MtF survey indicates that 4.4% are using daily. No explanation is forthcoming from the scientific community regarding this five-fold increase. However, it has occurred against a backdrop of incremental liberalization of cannabis. In Canada, 9% of 16–19-year-olds use cannabis daily.<sup>38,40</sup> In great contrast, the ESPAD survey in Europe indicates that 0.8% of 16-year-olds use daily, similar to the rates observed when ESPAD started in 1995.<sup>41</sup>

It will be important for Europe to avoid being dragged down the same policy path as North America. The current key priority is not legalization for adult use. It is the Trojan horse called “medical cannabis” that must not be invited into Europe.<sup>28</sup> The inappropriate term “medical cannabis” is best avoided.<sup>30</sup> If a network of dispensaries becomes established, then full legalization for adult use seems to be the inevitable next step. Based on North American experience, that policy journey seems to involve more adolescents using greater quantities of cannabis, a harm that we must avoid.

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# Implications of Legalization to Youth

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## Background

Cannabis is the most commonly used illicit substance world-wide.<sup>1</sup> Making cannabis legal and widely accessible will only result in more problematic use and addiction among those most susceptible to developing substance use disorders: adolescents. With roughly 1 in 10 regular adult users and 1 in 6 youth users developing cannabis use disorder (CUD), it is indisputable that today's increasingly potent cannabis is highly addictive, especially to youth.<sup>2</sup> From birth until the ages of 25, the brain undergoes an elegant and precisely orchestrated process of development that is greatly disrupted by exposure to cannabis. Imaging studies of the brain show physical changes in users that are both consistent with addiction and impaired cognitive function.<sup>3</sup> In fact, studies have shown that cannabis use in adolescents resulted in neurotoxic effects on inhibitory control, memory, and perceptual reasoning.<sup>4</sup>

Moreover, regular users of cannabis or cannabinoids experience withdrawal, one of the classic hallmarks of addiction.<sup>5</sup> A systematic review and meta-analysis of 50 clinical studies on nearly 24,000 regular users of cannabis or cannabinoids reported that 47% of users overall experienced cannabis withdrawal syndrome.<sup>6</sup>

## Evidence

As legalization gains momentum, use of cannabis is becoming increasingly normalized while the perceived harms of using the drug diminish, especially in the eyes of youth, leading to adverse social, health, and economic consequences.<sup>1,2</sup> The false mantra that cannabis is harmless has been so often repeated over the past 5 decades that it has sadly become part of our collective consciousness. Popular beliefs that cannabis is benign comes from outdated anecdotes and personal experiences, as well as from research performed decades ago when cannabis

was a fraction of today's potency. Currently, the average concentration of the psychoactive compound THC in cannabis strains is approximately 20%.<sup>7</sup> In contrast, the average concentration of THC present in cannabis in the 1960's and 70's was around 2-3%.<sup>7</sup> This nearly ten-fold increase in potency means that cannabis strains commonly encountered today are fundamentally different and much more harmful than those encountered in the bygone hippie era.

The increased potency of today's cannabis strains and products is already ushering in a host of mental health consequences for users, especially youth. Contemporary converging lines of evidence are finding several distinct links between hi-potency cannabis use and psychosis, which has been a growing concern among medical professionals. In an ongoing study of more than 9,000 youths, published in the *British Journal of Psychiatry*, those adolescents who had tried cannabis just five times or more had a 6.5-fold higher risk for developing psychosis.<sup>8</sup> One of the most comprehensive studies on cannabis and psychotic disorders was conducted by international researchers reporting in *Lancet Psychiatry*. They found a three-fold higher risk among daily cannabis users compared to nonusers.<sup>9</sup> But among users of high-potency cannabis (which was defined as THC concentrations of 10% or more), risks for psychotic disorders were more than five-times higher.<sup>9</sup> This raises serious public health concerns because more and more youth are using hi-potency cannabis, edibles, and concentrate products that can contain up to 99% THC. Youth use of these products carries the highest risk of progression to high frequency, problematic use.<sup>10</sup>

In addition to the increased risk for psychotic disorders, youth cannabis use is associated with increased risk for depression, anxiety, suicide, and use of hard drugs. Studies show that compared to non-users, youth who used marijuana were 1.4 times as likely to develop depression, 1.5 times as likely to experience suicidal ideation, and 2.5 times as likely to attempt suicide.<sup>11</sup> According to the Colorado Violent Death Reporting System, cannabis was the top toxicology finding in suicides among youth ages 10 to 19, with 20% of these deceased adolescents testing positive for cannabis.<sup>12</sup>

Although the gateway effect of cannabis use has been a topic of considerable debate, the science could not be more clear. In a recent analysis of data from the National Survey on Drug Use and Health, the largest continuing study on drug use in the USA, early initiation into marijuana use was the most powerful predictor of developing opioid use disorder in adulthood.<sup>13</sup> Dupont and colleagues also reported that compared to non-users, youth that used cannabis were approximately 10 times more likely to report hard drug use.<sup>14</sup>

### **Recommendations**

Regulatory restrictions such as minimum age requirements have not been sufficient in keeping cannabis out of the hands of young people. In the USA, states that have legalized recreational cannabis lead the country in rates of adolescent use. According to a recently published study in the *Journal of the American Medical Association (JAMA)*, US states that legalized recreational cannabis experienced a significant increase in problematic use among adolescents with all the attendant mental health risks such use entails.<sup>15</sup> This problem is further compounded by the fact that many cannabis-based products are commonly found in forms and packaging that appeal directly to youth such as sodas, cookies, and gummy bears.

The USA still is in the early stages of this large-scale natural experiment known as cannabis legalization. Yet data from states like Colorado are already painting a grim picture consisting of increased numbers of fatal car crashes, higher rates of addiction, hard drug use, mental health disorders, and suicide. For those countries that have not yet embarked on this reckless endeavor, they would do well to heed the strong signals emerging from population-level data in places that have already legalized cannabis. However, if policymakers insist upon treading this treacherous path, they should at least move in the interest of public health by implementing potency caps for THC levels in all cannabis products. It would be a tragic mistake to gamble with the future health, safety, and wellbeing of an entire generation of youth while allowing another for-profit addiction industry to line its pockets.



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# US Cannabis Policy: A Cautionary Tale

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Cannabis laws are rapidly changing in many parts of the United States. This is partly due to shifting attitudes: the public is becoming more supportive of policies that decriminalize or legalize cannabis because prohibition has not prevented access to the drug and has disproportionately harmed people of color and their communities (among others).<sup>1</sup> There is also a widespread belief that cannabis is safe relative to other substances and may have therapeutic benefits. However, risks of cannabis use have been well documented –it can lead to addiction, especially in those who start young; it raises the risk of car crashes; affects cognitive performance; can precipitate or worsen the course of psychosis in vulnerable individuals; and negatively affects life achievement and satisfaction.<sup>2</sup> Also, because the endocannabinoid system (where cannabis acts) plays an important role in brain development, cannabis may pose specific risks for children and adolescents, and babies in utero.<sup>3-5</sup> But

there is still much we do not know about cannabis, including the reversibility or persistence of its effects following abstinence; the impact of higher potency products [containing high levels of delta-9-tetrahydrocannabinol (THC)] and new routes of administration; and the potentially beneficial effects of cannabis or cannabinoids for treating pain and other conditions. It is crucial that cannabis users and healthcare professionals understand the state of the science related to its potential medicinal benefits and adverse health risks.

The rapidity of the changing legal landscape in the US, and the State-by-State implementation models have made it difficult to fully assess the impact of decriminalization, legalization for medical or adult use, and commercialization. Currently, 36 states plus the District of Columbia (DC) have broad medical marijuana laws [allowing for products containing THC and/or cannabidiol (CBD)] to treat a variety of conditions or symptoms; 18



states plus DC allow adult use (in persons over 21) in addition to medical use; and 11 states have restricted use for medical purposes to only products that are predominantly CBD. Policies continue to evolve and, detailed and harmonized baseline information does not exist for each state outside of what can be gleaned from National Surveys. Most assess lifetime, past month, and daily use; attitudes about cannabis use; and some also measure cannabis use disorders (CUDs; formerly abuse and dependence) (see e.g., *National Survey on Drug Use and Health* and the *Behavioral Risk Factor Surveillance System*). A few (including the NIDA-supported *Monitoring the Future Survey* of 8th, 10th, and 12th graders) have added questions about edibles and vaping of THC (and nicotine) in recent years. The advantage of these surveys is that they are long-standing and can measure trends over time. But they lack the granularity needed for States to assess how changing product types and availability are affecting consumer preferences and patterns of use; whether medical benefits outweigh risks, and if so, for what conditions and in lieu of or in combination with other treatments. Developing and deploying such measures is costly and will take time to ensure adequate cognitive testing and validation. For now, researchers are leveraging the large National datasets to assess the effects of the changing policies on various outcomes;<sup>6</sup> and they are conducting more targeted research to look at specific outcomes in States that differ according to the legal status.<sup>7</sup>

However, many of the most critical outcomes will take years to fully understand and require large longitudinal studies beginning in adolescence (e.g., *Adolescent Brain Cognitive Development* (ABCD Study<sup>®</sup>) or earlier *HEALTHy Brain and Child Development* (HBCD Study)) in order to discern the complexities and interactions of multiple factors that contribute to the effect of cannabis exposure on outcomes of interest, including mental illness, substance use and substance use disorders, pulmonary disease, productivity, and a variety of other health, social, and economic outcomes. For example, some but not all neuroimaging studies show differences in brain structure or function in cannabis users who start young and use frequently. However, those individuals may have other vulnerability factors (e.g., genetic, trauma, loss,

economic hardship, mental illness) that increase their risk for negative outcomes; or the observed differences in brain structure or function may have been pre-existing (and may even prompt early cannabis use); and multiple substances, including alcohol, are often concurrently used, the effects of which can be especially difficult to tease apart.

In addition to the multiple complexities noted above; standard measures of THC exposure (as with alcohol or tobacco) do not exist and exposure may be changing based on reported increasing plasma levels of THC or its metabolites in some studies. With the exception of edibles, most products legally purchased in the US do not specify the amount of THC contained, or typical serving size (or consumption amount) by whatever route of administration the product is being consumed. Thus, getting accurate measures of exposure from consumers will be difficult until products are properly labeled and consumers are better informed.

Even within an environment in which cannabis is legal, there are numerous policy decisions that can dramatically affect societal and individual outcomes. Multiple approaches to regulation exist between the extremes of prohibition or full commercialization.<sup>8-10</sup> Some alternatives have been adopted internationally (e.g., Uruguay's use of state-controlled dispensaries, home growth, or growth clubs, and also imposing potency limits)—it will be important to determine their impact. But within the US, most States allow full commercialization with differing approaches to licensing of manufacturers and distributors. Commercialization is inherently risky since it is driven by the profit motive. For cannabis and other consumer products (e.g., alcohol), the majority of sales are to frequent users or those with a use disorder;<sup>9,11</sup> thus the incentive is to create a large consumer base who use a lot; and early exposure (e.g., in childhood or adolescence) is known to increase the risk for CUD.

Additional regulatory considerations include (but are not limited to): types of products available (concentrates, cannabis-infused alcoholic beverages); locations of dispensaries; whether other products can be sold along with cannabis (e.g., alcohol); limits on serving sizes or potency; marketing re-

strictions; labeling requirements (health warnings); public consumption sites; smoke – free laws, licensing requirements for manufacturers; and levels of taxation. The latter has also provided strong motivation for States to allow cannabis commercialization, but taxation must be calibrated so as not to allow the illicit market to flourish. In general, cannabis is very inexpensive to produce—price elasticity, often an important policy lever for limiting tobacco and alcohol consumption (especially for younger consumers), is another consideration.

Two other important aspects include: 1) who is making the regulatory decisions; and 2) how taxes will be used. In most US States, the cannabis industry contributes to the regulatory decisions. Should these decisions be restricted to those whose main consideration is public health vs. profit? Can taxes be allocated towards prevention, especially among youth or women who are pregnant or breastfeeding; treatment of cannabis use disorder; and research—to determine not only the impact of these changing policies, but also to gen-

erate knowledge about the adverse effects of cannabis exposure, including high-potency products; and its potential therapeutic uses?

There are many factors that influence policy and legalization efforts that go beyond the health risks or benefits. The US is currently considering full Federal legalization of marijuana ([article](#)).<sup>12</sup> Much of the support for legalization is based on attempts to revert the discriminatory criminal justice activities that have permeated the “War on Drugs”, as well as an overall softening of attitudes about marijuana throughout the Country. However, legalization does not guarantee equity or necessarily make up for past injustices. And there are clear risks to public health that should not be ignored. It will take time to understand the full ramifications of such policies (should they get enacted). And it will be important for all parties interested in the public’s health to educate stakeholders in an honest and unbiased manner about the known risks and harms and potential benefits as the state of our science advances.

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# SAM - Smart Approaches to Marijuana

**Written by Kevin A. Sabet**

*PhD - SAM President and CEO*

## Evidence

Science must lead conversations regarding marijuana reform. Many people lack an understanding of the harms of marijuana, though a plethora of research confirms your contention that the drug is harmful.

Highly regarded researchers have found that:

- Marijuana is addictive<sup>1</sup> and appears to be a component cause of a host of mental illnesses, ranging from anxiety<sup>2</sup> and depression<sup>3</sup> to schizophrenia<sup>4</sup> and psychosis,<sup>5</sup> and even suicidality,<sup>6</sup> especially when use is initiated in youth.
- Marijuana use is associated with future substance misuse and addiction—individuals using marijuana, for example, are more likely to misuse prescription opioids.<sup>7</sup> Though the majority of those using marijuana won't go on to other drugs, more than 95% of those using heroin and cocaine started with marijuana.
- On its own, marijuana use can severely impact brain development<sup>8</sup> in young people, leading to lower IQ and to worse mental health, academic, and professional outcomes.
- The states with the highest level of youth use are states that have liberalized their marijuana laws.<sup>9</sup> Furthermore, Colorado has seen a dramatic, significant increase in youth use of high potency forms of marijuana, such as vapes and concentrates.<sup>10</sup>

- THC potency in marijuana plant material has increased from 1-3% in the 1970's to 18-23% today. Marijuana concentrates, which are increasingly more popular, can reach 90-95% THC.<sup>11</sup>
- Encouraged by a for-profit industry, more pregnant women than ever are using marijuana, with potentially severe consequences<sup>12</sup> for newborns.
- Marijuana can also cause cardiovascular harm,<sup>13</sup> and may cause certain kinds of cancer.<sup>14</sup>
- In states that legalized marijuana, marijuana-related traffic fatalities are significantly elevated. A study published last month found that widespread legalization could result in nearly 7,000 more traffic deaths<sup>15</sup> annually, due to impaired driving.

### Policy recommendations in states where marijuana has not been legalized

- Remove criminal penalties for the minor possession of marijuana and expunge prior arrest records individuals who have been arrested for possession of small amounts of marijuana.
- Marijuana use is to be discouraged, and individuals caught repeatedly with marijuana should be directed to early interventions

and/or treatment.

- A science-based public awareness campaign should be implemented across multiple types of media.
- Drugged driving prevention should be a priority, with tough laws imposed on those who chose to drive under the influence of marijuana.

### Policy recommendations in states that have legalized marijuana

- Marijuana edibles and other forms of high THC potency concentrates should be outlawed or severely banned.
- Representatives of the marijuana industry should not serve on rule-making bodies to determine regulations.
- Pot advertising and promotions should be prohibited.
- A science-based public awareness campaign on the potential harms of marijuana use should be implemented across multiple forms of media.
- Drugged driving prevention should be a priority, with tough laws imposed on those who drive stoned.

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# Colorado's Experience with Legal Marijuana

Written by Dr Christian Thurstone

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## Background

Colorado started allowing legal marijuana for medical purposes in 2001. In 2009, the state allowed commercialized medical marijuana. At that time, hundreds of medical marijuana stores opened across the state. In 2012, the state legalized recreational marijuana, and in 2014, retail marijuana stores opened. The state currently has about 570 retail marijuana stores and 430 medical marijuana stores. To purchase recreational marijuana, individuals need to be at least 21 years old and may possess up to two ounces (about 56 grams) of marijuana, including marijuana concentrate. To purchase medical marijuana, individuals need to have a qualifying medical condition and be Colorado residents.

## Outcomes

The main concerns about marijuana legalization and commercialization are “cars and kids.”

With respect to marijuana use and youth, the data are somewhat mixed. Below is a graph (figure 1)<sup>1</sup> of past month marijuana use in the state for 12- to 17-year-old youth. The graph shows that marijuana use is consistently higher in Colorado than the rest of the country with an increase immediately during legalization and a leveling off since then. Data from other surveys

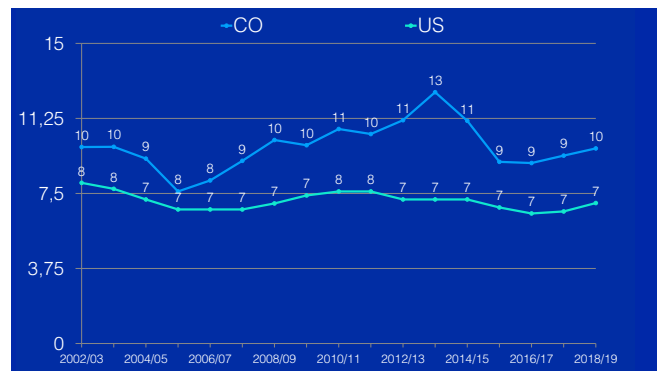


Figure 1 - 12 - 17 years olds: past month use



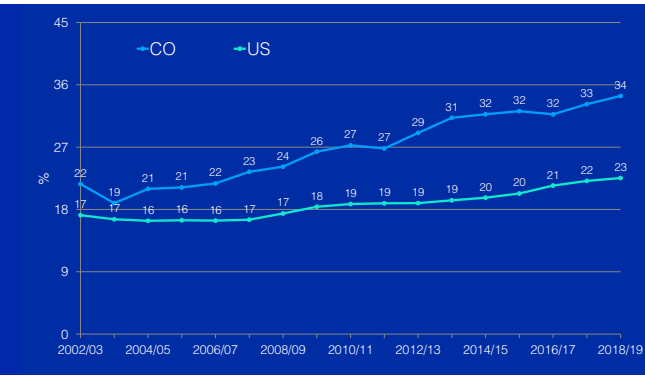


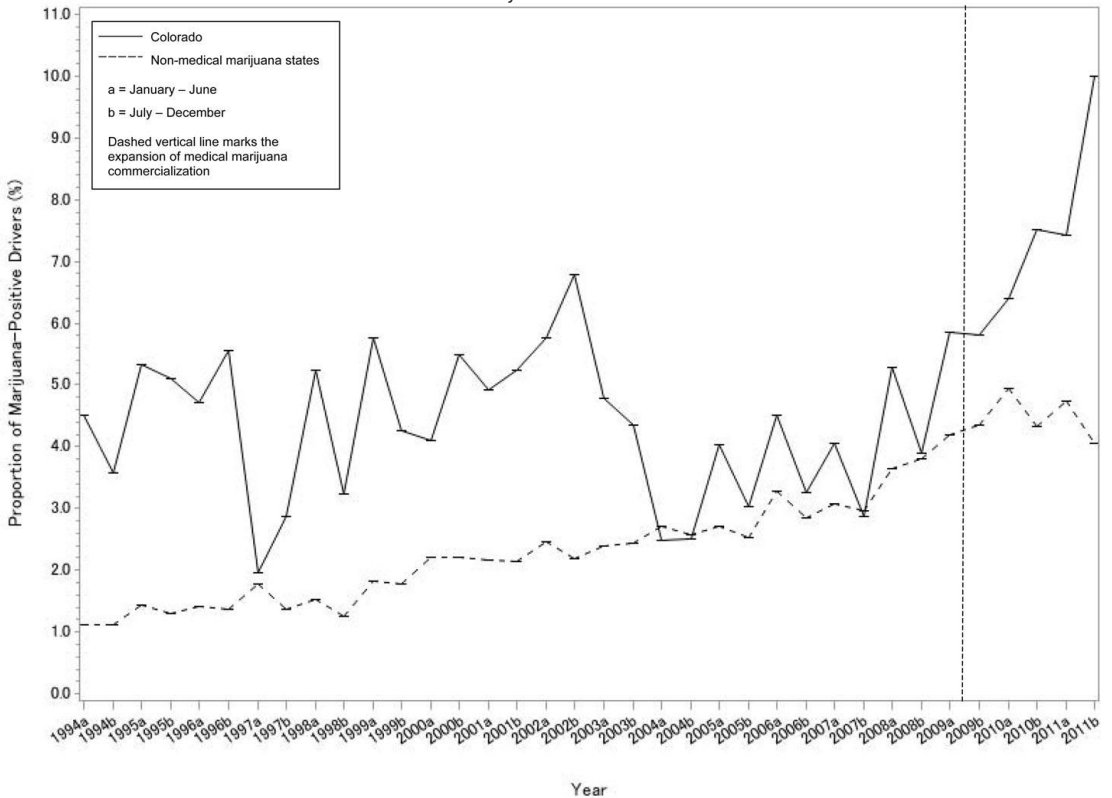
Figure 2 - NSDUH: 18-25 year olds

such as the Healthy Kids Colorado Survey do not include the pre-legalization time period and, therefore, do not offer helpful conclusions about the potential impact of marijuana legalization on youth. Nevertheless, these data are frequently cited by the marijuana industry and marijuana advocates as evidence that marijuana legalization has not affected youth.

Another graph (figure 2)<sup>1</sup> of marijuana use among 18- to 25- year old youth shows a clear increase in marijuana use in this age group. This increase is concerning because recent science shows that brain development takes place through that time frame. There is no doubt that the prevalence of marijuana use is increasing in this age group.

The second main concern is the impact of marijuana legalization on cars and driving. This situation has caused much debate about what is an acceptable range of marijuana intoxication or exposure for driving. Even if there were an accepted limit, testing for this limit is difficult because of the lack of a breathalyzer or similar measurement device for marijuana intoxication. As a result, traffic fatalities in which a driver tests positive for the drug have increased significantly. Attached is a graph (figure 3)<sup>2</sup> of the proportion of drivers involved in a fatality who tested positive for marijuana. The lower line

Figure 3 - Proportion of drivers in a fatal motor vehicle crash who were marijuana-positive in Colorado and 34 states without medical marijuana laws from 1994–2011





represents this statistic for states that did not have medical marijuana laws. The graph shows a clear increase in the traffic fatalities after Colorado commercialized marijuana in 2009, especially compared to states that did not have medical marijuana laws.

### Recommendations

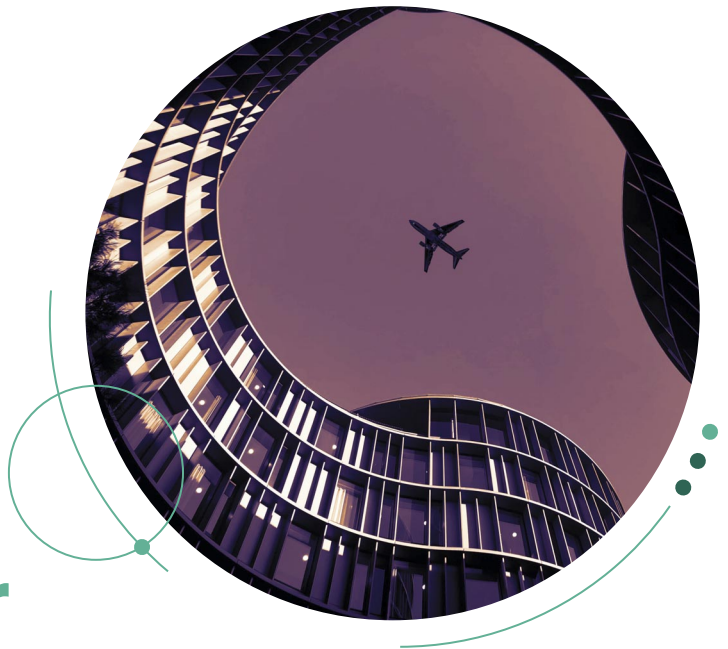
This evidence leads to the following recommendations.

- Medical marijuana laws lead to the commercialization of marijuana and the legalization of recreational marijuana.
- In Colorado, the commercialization of marijuana coincides with an increase in marijuana use among young people.
- Marijuana commercialization corresponds to an increase in traffic fatalities in which the driver tests positive for the drug.
- The main concerns around marijuana medicalization, commercialization, and legalization center on “cars and kids.”



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## CLOSING WORD

# Why Your Opinion on Cannabis is Irrelevant?

**"People do not form attitudes based on good arguments. They form attitudes based on emotions and ideologies. Then they activate their ability to understand to justify those attitudes."**

*Jerry Taylor*

**T**here are two primary perspectives one can take on the legalization issue.

One is an advantage / disadvantage balance based on philosophical arguments.

Philosophical because we simply do not know what it would be like if cannabis were legalized in the Nordic countries.

The second perspective is that we can take the knowledge we have about the harmful effects of cannabis and at the same time look at other countries' experiences of legalization or decriminalization.

The problem with the discussion is that it is philosophical and postulating - and that it does not bring us closer to helping those who already have an addiction.

If anything, it brings more people on the trail of an abuse.

All the while we are discussing legalization, there are young people who need help to get out of a cannabis addiction.

We are balancing on a knife edge in the debate on cannabis. We risk falling into one of the sides where we either romanticize or demonize cannabis.

None of the parts help us understand the facts that exist about cannabis.

There is a consensus among researchers in the field about harmful effects of cannabis, so it may come as a surprise that this consensus does not characterize the debate to a greater extent.

The explanation is that the rhetoric in the debate is characterized by the following elements:

- Persuasion and conspiracy thinking
- Denial of known facts
- Correct statements, that are irrelevant
- Philosophical arguments
- Anonymity
- Allegations that cannot be verified
- "Going after the man, not the ball"
- Massive online activity (spam)
- Incorrect sources

Let's start by using what we know and stop guessing on what we don't know.

Denial of known facts, philosophical arguments, allegations that cannot be verified is "reverse pickpocketing". Before we know it, we are discussing opinions and personal attitudes.

A necessary premise in the debate must be that you are entitled to your own opinion, *not to your own facts*.

We hope that we with this Summit and The White Guide have given you the tools to keep the discussion on track towards sound policies that will ultimately help the youth of our nations.

If we can leave you with one thing, let it is this:

*Listen to the facts and entertain yourself with philosophical arguments. The opposite does not make us wiser.*



# GET INVOLVED & JOIN OUR GLOBAL NETWORK!



WFAD is a fast-growing multilateral community of over 320 non-governmental organisations and 380 individuals in 60 countries representing all regions of the world. Our common aim is to strengthen prevention, increase access to treatment, and promote recovery.

## **STRENGTHEN PREVENTION, PROMOTE RECOVERY!**

