# MARIJUANA AS A MEDICINE - POLICY, SIDE EFFECTS, SPECIFIC ILLNESSES

**By David G. Evans, Esq. * CIVEL**

**Table of contents**



## Introduction

The marijuana industry referred to here are those who illegally, negligently or fraudulently produce, market, or distribute marijuana. The marijuana industry's advocacy surrounding marijuana as medicine is riddled with half-truths, anecdotes, and empty promises.[1] This paper will discuss policy when marijuana is used as a medicine. It will then discuss the negative side effects of marijuana use. We will also look at particular ailments that marijuana is used for and discuss its safety and effectiveness for those conditions.

You can also learn about the problems marijuana causes by doing some research about marijuana on a number of websites.[2]

When most people think of medical marijuana these days, they don't think of a pill with an isolated component of marijuana, but rather the smoked, vaporized or edible version of the whole marijuana plant also known as "botanical" marijuana. [3]

> Rather than isolate active ingredients in the plant - as we do with the opium plant when we create morphine, for example - many legalization proponents advocate vehemently for smoked (or vaporized) marijuana to be used as a medicine. But the science on smoking any drug is clear: smoking - especially highly-potent whole marijuana - is not a proper delivery method, nor do other delivery methods ensure a reliable dose. And while parts of the marijuana plant have medical value, the Institute of Medicine said in its landmark 1999 report: "Scientific data indicate the potential therapeutic value of cannabinoid drugs

---

[1] https://learnaboutsam.org/wp-content/uploads/2017/02/SAM-testimony-Kansas-Feb-2017.pdf

[2] https://www.ncbi.nlm.nih.gov/pubmed/?term=marijuana
https://www.sciencedaily.com/
https://clinicaltrials.gov/
http://www.who.int/medicines/access/controlled-substances/6_2_cannabis_update.pdf

Much of the information used here comes from government publications in the public domain. They are cited.

[3] https://learnaboutsam.org/wp-content/uploads/2017/02/SAM-testimony-Kansas-Feb-2017.pdf

... smoked marijuana, however, is a crude THC delivery system that also delivers harmful substances and should not be generally recommended. . . " [4]

Non-botanical synthetic THC has proven medical benefits in particular formulations. The FDA has approved synthetic THC-based medications, dronabinol (Marinol®) and nabilone (Cesamet®), prescribed in pill form for the treatment of nausea in patients undergoing cancer chemotherapy and to stimulate appetite in patients with wasting syndrome due to AIDS. In 2018 the FDA also approved a CBD-based liquid medication called Epidiolex® for the treatment of two forms of severe childhood epilepsy, Dravet syndrome and Lennox-Gastaut syndrome. It's being delivered to patients in a reliable dosage form and through a reproducible route of delivery to ensure that patients derive the anticipated benefits. [5]

Marinol is better for many patients because it is often cheaper and more convenient to use than smoked marijuana. Marinol as an FDA approved drug is covered by medical insurance plans and can be obtained at local drug stores. In addition, Marinol can be ingested more privately than smoked "medical" marijuana. Some people who use marijuana have built a tolerance for the drug and claim that Marinol does not work. This is because they have a tolerance to it. All a doctor has to do to overcome the tolerance is increase the dosage and it will work. Some people who inhale marijuana claim that it works faster to get the effect. However, the effect from inhaling also goes way faster. Marinol provides a longer period of effect which is better for the patient. They also claim that some people cannot swallow a pill but pills can be crushed and swallowed that way. Researchers generally consider medications like these, which use purified chemicals derived from or based on those in the marijuana plant, to be more promising therapeutically than use of the whole marijuana plant or its crude extracts. Development of drugs from botanicals such as the marijuana plant poses numerous challenges. Botanicals may contain hundreds of unknown, active chemicals, and it can be difficult to develop a product with accurate and consistent doses of these chemicals. Use of marijuana as medicine also poses other problems such as the adverse health effects of smoking and THC-induced cognitive impairment. The negative side effects of marijuana use are provided in detail herein. [6]

An additional concern with "medical marijuana" is that little is known about the long-term impact of its use by people with health- and/or age-related vulnerabilities - such as older adults or people with cancer, AIDS, cardiovascular disease, multiple sclerosis, or other neurodegenerative diseases. Further research will be needed to determine whether people whose health has been compromised by disease or its treatment (e.g., chemotherapy) are at greater risk for adverse

---

[4] Marijuana and Medicine: Assessing the Science Base, Institute of Medicine 1999. http://books.nap.edu/catalog.php?record_id=6376 2

https://learnaboutsam.org/wp-content/uploads/2017/02/SAM-testimony-Kansas-Feb-2017.pdf

[5] https://www.drugabuse.gov/publications/research-reports/marijuana/marijuana-safe-effective-medicine

[6] https://www.drugabuse.gov/publications/research-reports/marijuana/marijuana-safe-effective-medicine

health outcomes from marijuana use. [7] The potential adverse health outcomes are discussed in detail in this document. [8]

[7] https://www.drugabuse.gov/publications/research-reports/marijuana/marijuana-safe-effective-medicine

[8]

## THE POLICY ARGUMENT AGAINST MARIJUANA AS A MEDICINE

### The FDA process of medicine approval

The FDA medicine approval process represents the best way to help ensure that safe and effective new medicines are available to patients in need of appropriate medical therapy. It is important and appropriate to use the same scientific standards in the development and assessment of any drug.

> If any components of marijuana are ever shown to be beneficial to treat any illness then those components can and should be delivered by nontoxic routes of administration in controlled doses just all other medicines are in the U.S. [9]

In 2006, the FDA made the following statement about the smoking of the marijuana plant as a medicine.

> Inter-agency Advisory Regarding Claims That Smoked Marijuana as a Medicine
>
> Claims have been advanced asserting smoked marijuana has a value in treating various medical conditions. Some have argued that herbal marijuana is a safe and effective medication and that it should be made available to people who suffer from a number of ailments upon a doctor's recommendation, even though it is not an approved drug.
>
> Marijuana is listed in schedule I of the Controlled Substances Act (CSA), the most restrictive schedule. The Drug Enforcement Administration (DEA), which administers the CSA, continues to support that placement and FDA concurred because marijuana met the three criteria for placement in Schedule I under 21 U.S.C. 812(b)(1) (e.g., marijuana has a high potential for abuse, has no currently accepted medical use in treatment in the United States, and has a lack of accepted safety for use under medical supervision). Furthermore, there is currently sound evidence that smoked marijuana is harmful. A past evaluation by several Department of Health and Human Services (HHS) agencies, including the Food and Drug Administration (FDA), Substance Abuse and Mental Health Services Administration (SAMHSA) and National Institute for Drug Abuse (NIDA), concluded that no sound scientific studies supported medical use of marijuana for treatment in the United States, and no animal or human data supported the safety or efficacy of marijuana for general medical use. There are alternative FDA-approved medications in existence for treatment of many of the proposed uses of smoked marijuana.

---

[9] "Medical Marijuana: Clinical Considerations and Concerns," Richard G. Soper, MD, AZ Medicine, Summer 2011 For complete reprints of the original article, contact Dr. Soper at the Center for Behavioral Wellness, 2830 Bransford Ave., Nashville, TN, 37204; phone: 615-292-5747, fax: 615-2925749; email: mdjd@justice.corn.

FDA is the sole Federal agency that approves drug products as safe and effective for intended indications. The Federal Food, Drug, and Cosmetic (FD&C) Act requires that new drugs be shown to be safe and effective for their intended use before being marketed in this country. FDA's drug approval process requires well-controlled clinical trials that provide the necessary scientific data upon which FDA makes its approval and labeling decisions. If a drug product is to be marketed, disciplined, systematic, scientifically conducted trials are the best means to obtain data to ensure that drug is safe and effective when used as indicated. Efforts that seek to bypass the FDA drug approval process would not serve the interests of public health because they might expose patients to unsafe and ineffective drug products. FDA has not approved smoked marijuana for any condition or disease indication.

A growing number of states have passed voter referenda (or legislative actions) making smoked marijuana available for a variety of medical conditions upon a doctor's recommendation. These measures are inconsistent with efforts to ensure that medications undergo the rigorous scientific scrutiny of the FDA approval process and are proven safe and effective under the standards of the FD&C Act. Accordingly, FDA, as the federal agency responsible for reviewing the safety and efficacy of drugs, DEA as the federal agency charged with enforcing the CSA, and the Office of National Drug Control Policy, as the federal coordinator of drug control policy, do not support the use of smoked marijuana for medical purposes.

**CBD and THC**

Cannabidiol (CBD) is a derivative of marijuana and of the main active ingredients in the marijuana plant. The chemical in marijuana that causes the high (and many of its other effects) is delta-9 tetrahydrocannabinol, or THC. But there are over 100 other cannabinoid chemicals in the plant; CBD is one of those. Different cannabinoids can have very different biological effects; pure CBD, for example, does not normally make people high and is not intoxicating. Over the past several years, FDA has issued several warning letters to firms that market unapproved new drugs that allegedly contain cannabidiol (CBD). As part of these actions, FDA has tested the chemical content of cannabinoid compounds in some of the products, and many were found to not contain the levels of CBD they claimed to contain. It is important to note that these products are not approved by FDA for the diagnosis, cure, mitigation, treatment, or prevention of any disease. Consumers should beware purchasing and using any such products. [10]

The FDA approved Epidiolex® (cannabidiol, CBD). CBD is one of more than 80 active chemicals in marijuana. The FDA was quick to note however, that this is not an approval of marijuana or all of its components. This is the approval of one specific CBD medication for a specific use. It was based on well-controlled clinical trials evaluating the use of this compound in

[10] See the 2016 warning letter section at:
https://www.fda.gov/NewsEvents/PublicHealthFocus/ucm484109.htm

the treatment of a specific condition. Moreover, this is a purified form of CBD. It's being delivered to patients in a reliable dosage form and through a reproducible route of delivery to ensure that patients derive the anticipated benefits. This is how sound medical science is advanced. [11]

**CBD as a "Medicine" - the Wild Claims**

Some of the companies that are producing and selling CBD on a national scale have made wildly inflated medical claims about CBD. Acceptance of, and advocacy for, these claims by a percentage of the public shows the need for an assessment of the actual benefits and adverse side effects. Medications should be pure, of known and consistent efficacy and dose, and be produced by a manufacturer that is legally responsible for the quality of the medication. Because there are no or very loose standards in production of CBD most CBD products are suspect. The one exception is Epidiolex® an FDA approved medicine.[12]

In a paper published in Missouri Medicine, R. L. Hilderbrand PhD. noted that:

> A 2017 study looking at market share of products by a Cannabis investment group finds CBD is being used to replace traditional pharmaceuticals. The top conditions being treated included anxiety (67%), insomnia (60%), joint pain and inflammation (52%) and depression (43%). Respondents preferred CBD derived from cannabis to CBD derived from industrial hemp and only 9% of respondents indicated using hemp-derived CBD exclusively. The preference for CBD from Cannabis is significant because, without purification, the CBD extracted from Cannabis will, most likely, contain a much higher percentage of THC than does CBD from hemp. [13]

**The need for FDA approval**

It is our position that any marijuana product intended "for use in the diagnosis, cure, mitigation, treatment, or prevention of disease and/or because they are intended to affect the structure or any function of the body" that has not been approved for marketing by the federal Food and Drug Administration it is neither safe nor effective and puts patients at risk. Section 201(g)(1) of the

---

[11] Statement by FDA Commissioner Scott Gottlieb, M.D., on the importance of conducting proper research to prove safe and effective medical uses for the active chemicals in marijuana and its components. https://www.fda.gov/NewsEvents/Newsroom/PressAnnouncements/ucm611047.htm

[12] Hemp & Cannabidiol: What is a Medicine? by R. L. Hilderbrand PhD
https://www.msma.org/uploads/6/2/5/3/62530417/hemp_and_cannabidiol_july_august_2018_momed.pdf

https://www.fda.gov/NewsEvents/PublicHealthFocus/ucm484109.htm

[13] Hemp & Cannabidiol: What is a Medicine? by R. L. Hilderbrand PhD
https://www.msma.org/uploads/6/2/5/3/62530417/hemp_and_cannabidiol_july_august_2018_momed.pdf

Federal Food, Drug, and Cosmetic Act (the Act) [21 U.S.C. § 321(g)(1)].

Before the development of modern pharmaceutical science, the field of medicine was fraught with potions. There were as many anecdotal stories about these potions as there are today about marijuana. Many people were convinced that these potions helped them; however, many of these potions were absolutely useless, or conversely, were harmful to unsuspecting ill people. Thus evolved our current FDA drug approval process. The FDA process has protected us for 100 years; it is dangerous to undermine it. A number of states have approved marijuana as a medicine. They have ignored the FDA process and made these decisions mostly based on anecdotal reports. The anecdotal reports regarding "medical" marijuana are not reliable scientific evidence because the claimed benefits were not independently verified and do not reflect double-blind controls. The anecdotal reports may also be inaccurate due to the emotional expectancy of the person using marijuana and the placebo effect. In some cases there may be deliberate exaggeration for ideological reasons.

Marijuana with THC is intoxicating, so it's not surprising that sincere people report relief of their symptoms when they smoke it. They may be feeling better - but they are not actually getting better. They may even be getting worse due to the detrimental effects of marijuana.

**No medicine is smoked**

Smoking is a very poor way to deliver a drug because we cannot calculate the dose of smoked marijuana since there is no way to determine how much is actually inhaled. In addition, the harmful chemicals and carcinogens that are byproducts of smoked marijuana create new health problems. The smoking of marijuana has significant risks. For a drug to be acceptable, its beneficial results must outweigh the adverse effects, especially when the advocates argue for the repeated use for symptomatic relief. [14]

**What are the effects of second hand exposure to marijuana smoke?**

Researchers measured the amount of THC in the blood of people who do not smoke marijuana and had spent 3 hours in a well-ventilated space with people casually smoking marijuana; THC was present in the blood of the nonsmoking participants, but the amount was well below the level needed to fail a drug test. Another study that varied the levels of ventilation and the potency of the marijuana found that some nonsmoking participants exposed for an hour to high-THC marijuana (11.3 percent THC concentration) in an unventilated room showed positive urine assays in the hours directly following exposure; a follow-up study showed that nonsmoking

---

[14] Inter-Agency Advisory Regarding Claims That Smoked Marijuana Is a Medicine. U.S. Food and Drug Administration, April 20, 2006

"Smoked Marijuana as Medicine: Not Much Future," Clinical Pharmacology & Therapeutics (2008), H Kalant, Department of Pharmacology, University of Toronto, Toronto, Ontario, Canada

people in a confined space with people smoking high-THC marijuana reported mild subjective effects of the drug - a "contact high" - and displayed mild impairments on performance in motor tasks. A 2016 study in rats found that secondhand exposure to marijuana smoke affected a measure of blood vessel function as much as secondhand tobacco smoke, and the effects lasted longer. One minute of exposure to secondhand marijuana smoke impaired flow-mediated dilation (the extent to which arteries enlarge in response to increased blood flow) of the femoral artery that lasted for at least 90 minutes; impairment from 1 minute of secondhand tobacco exposure was recovered within 30 minutes. The effects of marijuana smoke were independent of THC concentration; i.e., when THC was removed, the impairment was still present. This research has not yet been conducted with human subjects, but the toxins and tar levels known to be present in marijuana smoke raise concerns about exposure among vulnerable populations, such as children and people with asthma. [15] Marijuana smoke is a known carcinogen. [16]

**Botanical Marijuana Is More Dangerous than FDA Regulated Drugs**

Here are some of the reasons that marijuana may be more dangerous than FDA regulated drugs

1. There is no pharmacy label with warnings.
2. There are no standardized dosages.
3. There are unknown contaminants, unknown contraindications, unknown drug interactions unknown effect and unknown side effects.
4. Marijuana has been shown to cause many physical and mental ailments
6. The adverse risk associated with marijuana treatment is greater than that associated with FDA approved treatments.
7. The risks of adverse events is unknown and not adequately tested.
8. Marijuana as medicine was designed, tested, manufactured, marketed, produced, distributed, and advertised negligently, defectively, fraudulently and improperly.

**Use of Other Prescription Drugs**

A study showed that medical marijuana users were significantly more likely to report medical use of prescription drugs in the past 12 months. Individuals who used medical marijuana were also significantly more likely to report nonmedical use in the past 12 months of any prescription drug with elevated risks for pain relievers, stimulants and tranquilizers.[17]

---

[15] https://www.drugabuse.gov/publications/research-reports/marijuana/marijuana-safe-effective-medicine

[16] Evidence on the Carcinogenicity of Marijuana Smoke, August 2009, Reproductive and Cancer Hazard Assessment Branch Office of Environmental Health Hazard Assessment, California Environmental Protection Agency, https://oehha.ca.gov/media/downloads/proposition-65/chemicals/finalmjsmokehid.pdf

[17] Journal of Addiction Medicine, http://www.newswise.com/articles/view/693004/?sc=dwtn

**The Fatal Flaws of Botanical "Medical" Marijuana**

The "medical" marijuana advocates have many questions to answer. The "medical" marijuana advocates claim that marijuana is good for many medical conditions. Before these claims are upheld, they must answer some fundamental questions:

What peer-reviewed scientific research exists on marijuana use for the conditions that shows:

1. the effectiveness of marijuana use for the condition
2. the risks of marijuana use for that condition
3. the benefits of marijuana use for that condition
4. the dosage of marijuana for adults and children for that condition
5. the interactions with other drugs and marijuana for that condition
6. the impact of marijuana use on other pre-existing conditions
7. the alternatives to marijuana use for that condition?

What adequate and well-controlled clinical studies exist that show the frequency of administration, duration of administration, time of administration, in relation to time of meals, time of onset of symptoms, or other time factors, route or method of administration of marijuana for all these medical conditions? These questions must be answered before a drug can be used for medicine. Any studies should include:

1. Independent verification - the study is not financed by industry who has a financial gain to be had on the study's outcome.
2. Double-blind controls
3. Study done on a significant patient population
4. Peer reviewed and published in a respectable journal dedicated to medicine or the particular illness.
5. Controlled comparison to existing medications for the particular illness.

The criteria for an "adequate and well-controlled study" for purposes of determining the safety and efficacy of a human drug is defined under the Code of Federal Regulations (CFR) in 21 CFR 314.126. The elements of an adequate and well-controlled study as described in 21 CFR 314.126 can be summarized as follows:

1. The main objective must be to assess a therapeutically relevant outcome.
2. The study must be placebo-controlled.
3. The subjects must qualify as having the medical condition being studied.
4. The study design permits a valid comparison with an appropriate control condition.
5. The assignment of subjects to treatment and control groups must be randomized.
6. There is minimization of bias through the use of a double-blind study design.
7. The study report contains a full protocol and primary data.
8. Analysis of the study data is appropriately conducted.

**The National Cancer Institute requirements** [18]

To qualify for a level of evidence analysis, a study must:

1. Be published in a peer-reviewed scientific journal.
2. Report on therapeutic outcome or outcomes, such as tumor response, improvement in survival, or measured improvement in quality of life.
3. Describe clinical findings in sufficient detail for a meaningful evaluation to be made.

Separate levels of evidence scores are assigned to qualifying human studies on the basis of statistical strength of the study design and scientific strength of the treatment outcomes (i.e., endpoints) measured. The resulting two scores are then combined to produce an overall score.

**Federal Institute of Medicine Recommendations**

Any research that is done on marijuana as medicine, or that is considered as evidence of the effectiveness of marijuana as medicine, should take into account the below federal Institute of Medicine Recommendations.

Recommendation 1: Research should continue into the physiological effects of synthetic and plant-derived cannabinoids and the natural function of cannabinoids found in the body. Because different cannabinoids appear to have different effects, cannabinoid research should include, but not be restricted to, effects attributable to THC alone.

Recommendation 2: Clinical trials of cannabinoid drugs for symptom management should be conducted with the goal of developing rapid-onset, reliable, and safe delivery systems.

Recommendation 3: Psychological effects of cannabinoids such as anxiety reduction and sedation, which can influence perceived medical benefits, should be evaluated in clinical trials.

Recommendation 4: Studies to define the individual health risks of smoking marijuana should be conducted, particularly among populations in which marijuana use is prevalent.

Recommendation 5: Clinical trials of marijuana use for medical purposes should be conducted under the following limited circumstances: trials should involve only short-term marijuana use (less than six months); be conducted in patients with conditions for which there is reasonable

---

[18] PDQ® Integrative, Alternative, and Complementary Therapies Editorial Board. PDQ Cannabis and Cannabinoids. Bethesda, MD: National Cancer Institute.
https://www.cancer.gov/about-cancer/treatment/cam/hp/cannabis-pdq
Accessed August 13, 2018
https://www.cancer.gov/about-cancer/treatment/cam/hp/cannabis-pdq#section/_13

expectation of efficacy; be approved by institutional review boards; and collect data about efficacy.

Recommendation 6: Short-term use of smoked marijuana (less than six months) for patients with debilitating symptoms (such as intractable pain or vomiting) must meet the following conditions:

1. failure of all approved medications to provide relief has been documented
2. the symptoms can reasonably be expected to be relieved by rapid onset cannabinoid drugs
3. such treatment is administered under medical supervision in a manner that allows for assessment of treatment effectiveness
4. involves an oversight strategy comparable to an institutional review board process that could provide guidance within 24 hours of a submission by a physician to provide marijuana to a patient for a specified use. [19]

In her testimony entitled "Cannabis and Medicinal Properties" before the Crime and Terrorism Subcommittee of the U.S. Senate Committee on the Judiciary in 2016, Bertha K Madras, PhD, Professor of Psychobiology, Department of Psychiatry, Harvard Medical School noted that:

1. The chemical composition of marijuana and its various preparations (smoke, vapor, edibles, beverages, creams, suppositories, etc) is variable; safe and effective dose ranges (and plant strain) for each medical condition remain uncertain, unresolved.
2. Efficacy criteria have not been fulfilled by rigorous research.
3. Side-by-side studies comparing currently approved, and possibly safer medications are rare.
4. Safety studies are inadequate and of short duration; a growing body of scientific evidence shows that marijuana use for psychoactive purposes is unsafe and associated with unhealthy outcomes. Long term studies on use of various forms of dispensary marijuana for medicinal purposes are not widely available. Similar unknowns exist for opioids.
5. There is no consensus by qualified experts that marijuana is a medicine.
6. Raw data are not available for a number of clinical reports.

If these studies do not exist, botanical marijuana should not be used.

**Dosing**

There is not good medical science on dosing with marijuana. Marijuana effects can have two phases (biphasic) 1. A low dose may relieve a symptom 2. but a higher dose may make it worse. The delivery method and dose of marijuana may also the effect efficacy and range of side effects

---

[19] Marijuana and Medicine: Assessing the Science Base. Janet E. Joy, Stanley J. Watson, Jr., and John A. Benson, Jr., Editors. Division of Neuroscience and Behavioral Health. Institute of Medicine, National Academy of Sciences. National Academy Press, Washington D.C., 1999.

and there are no reliable data to indicate what is more efficacious and/or best tolerated. Patients may have different responses depending on gender, medical conditions, age and those who have not been prior marijuana users. Only by going through our normal FDA medicine approval process looking at the benefit/risk profile of marijuana can dosing be assessed. There is no clear correct dose as THC and other cannabinoids in marijuana can vary considerably. Since marijuana is used mostly for chronic conditions requiring a long term of use there is the issue of the development of tolerance and dependence and withdrawal upon ending use. There is also lack of exacting standards to ensure purity and uniformity of the marijuana's constituents. The standards vary from state to state and so do the composition, purity, and concentrations of the of the marijuana also to vary. This is a major problem because marijuana has more than 100 cannabinoids, flavonoids and terpenoids that cause effects. In addition, in clinical trials of marijuana, patients with pre-existing serious mental disorders, significant hepatic or renal impairment, epilepsy, cardiac conditions, or prior substance abuse/ dependence are normally excluded. Nevertheless, people with these conditions are routinely given marijuana. [20]

**National Medical Organizations Oppose Medical Marijuana**

Major medical associations and major public health organizations, have weighed in strongly against the concept of smoked or non-FDA approved marijuana as a medicine. [21]

American Society of Addiction Medicine:

> ASAM asserts that cannabis, cannabis-based products, and cannabis delivery devices should be subject to the same standards that are applicable to other prescription medications and medical devices and that these products should not be distributed or otherwise provided to patients unless and until such products or devices have received marketing approval from the Food and Drug Administration. ASAM rejects smoking as a means of drug delivery since it is not safe. ASAM rejects a process whereby State and local ballot initiatives or legislative efforts approve medicines because these initiatives are being decided by individuals not qualified to make such decisions." [22]

American Cancer Society:

> The ACS is supportive of more research into the benefits of cannabinoids. Better and more effective treatments are needed to overcome the side effects of cancer and its

---

[20] "Medical Marijuana: Clinical Considerations and Concerns," Richard G. Soper, MD, AZ Medicine, Summer 2011 For complete reprints of the original article, contact Dr. Soper at the Center for Behavioral Wellness, 2830 Bransford Ave., Nashville, TN, 37204; phone: 615-292-5747, fax: 615-2925749; email: mdjd@justice.corn.

[21] https://learnaboutsam.org/wp-content/uploads/2017/02/SAM-testimony-Kansas-Feb-2017.pdf

[22] ASAM Public Polict Statement on Marijuana, Found at: http://www.asam.org/docs/default-source/public-policystatements/lmedical-marijuana-4-1O.pdf?sfvrsn=O

treatment. The ACS does not advocate the use of inhaled marijuana or the legalization of marijuana." [23]

American Glaucoma Foundation:

> Marijuana, or its components administered systemically, cannot be recommended without a long-term trial which evaluates the health of the optic nerve," said the editorial. "Although marijuana can lower IOP,* its side effects and short duration of action, coupled with a lack of evidence that its use alters the course of glaucoma, preclude recommending this drug in any form for the treatment of glaucoma at the present time. [24]
>
> * Inter Ocular Pressure (IOP)

National Multiple Sclerosis Society:

> Although it is clear that cannabinoids have potential both for the management of MS symptoms such as pain and spasticity, as well as for neuroprotection, the Society cannot at this time recommend that medical marijuana be made widely available to people with MS for symptom management. This decision was not only based on existing legal barriers to its use but, even more importantly, because studies to date do not demonstrate a clear benefit compared to existing symptomatic therapies and because issues of side effects, systemic effects, and long-term effects are not yet clear. [25]

American Academy of Pediatrics (AAP):

> Any change in the legal status of marijuana, even if limited to adults, could affect the prevalence of use among adolescents." While it supports scientific research on the possible medical use of cannabinoids as opposed to smoked marijuana, it opposes the legalization of marijuana. [26]

---

[23] Medical Use of Marijuana: ACS Position, Found at: http://medicalmarijuana.procon.org/sourcefiles/americancancer-society-position .pdf

[24] Marijuana for Glaucoma: Patients Beware! Found at: https://www.glaucomafoundation.org/news_detail.php?id=161

[25] Recommendations Regarding the Use of Cannabis in Multiple Sclerosis: Executive Summary. National Clinical Advisory Board of the National Multiple Sclerosis Society, Expert Opinion Paper, Treatment Recommendations for Physicians, April 2, 2008 .http://www.nationalmssociety.org.

[26] Committee on Substance Abuse and Committee on Adolescence. "Legalization of Marijuana: Potential Impact on Youth." Pediatrics Vol. 113, No. 6 (June 6,2004): 1825-1826. See also, Joffe, Alain, MD, MPH, and Yancy, Samuel, MD. "Legalization of Marijuana: Potential Impact on Youth." Pediatrics Vol. 113, No. 6 (June 6, 2004): e632-e638h.

American Medical Association (AMA):

> The AMA calls for more research on the subject, but indicates that such a call "should not be viewed as an endorsement of state-based medical cannabis programs, the legalization of marijuana, or that scientific evidence on the therapeutic use of cannabis meets the current standards for a prescription drug product. [27]

John Knight, director of the Center for Adolescent Substance Abuse Research at Children's Hospital Boston:

> Marijuana has gotten a free ride of sorts among the general public, who view it as non-addictive and less impairing than other drugs. However, medical science tells a different story. [28]

Christian Thurstone, a board-certified Child and Adolescent Psychiatrist, an Addiction Psychiatrist, and an Assistant Professor of Psychiatry at the University of Colorado:

> In the absence of credible data, this debate is being dominated by bad science and misinformation from people interested in using medical marijuana as a step to legalization for recreational use. Bypassing the FDA's well-established approval process has created a mess that especially affects children and adolescents. Young people, who are clearly being targeted with medical marijuana advertising and diversion, are most vulnerable to developing marijuana addiction and suffering from its lasting effects. [29]

---

[27] AMA Policy, Found at: http://medicalmarijuana.procon.org/sourcefiles/AMA09poflcy.pdf

[28] https://learnaboutsam.org/wp-content/uploads/2017/02/SAM-testimony-Kansas-Feb-2017.pdf

[29] https://learnaboutsam.org/wp-content/uploads/2017/02/SAM-testimony-Kansas-Feb-2017.pdf

## ADVERSE SIDE EFFECTS OF MARIJUANA USE IN PATIENTS [30]

Before a drug is used as a medicine there should be an analysis to see if the negative side effects are outweighed by the benefits of the drug. Approximately 40 to 60% of people who use marijuana report unpleasant side effects. The Institute of Medicine (IOM) states that marijuana a "powerful drug with a variety of effects." [31]

### A Rise in Marijuana's THC Levels

The amount of THC in marijuana has been increasing steadily over the past few decades. For a person who's new (naive) to marijuana use, this may mean exposure to higher THC levels with a greater chance of a harmful reaction. Higher THC levels may explain the rise in emergency room visits involving marijuana use. The popularity of edibles also increases the chance of harmful reactions. Edibles take longer to digest and produce a high. Therefore, people may consume more to feel the effects faster, leading to dangerous results. Higher THC levels may also mean a greater risk for addiction if people are regularly exposing themselves to high doses. [32]

THC acts on numerous areas in the brain and the body. The below facts are from the National Institute on Drug Abuse [33]

### Short-Term Effects

When a person smokes marijuana, THC quickly passes from the lungs into the bloodstream. The blood carries the chemical to the brain and other organs throughout the body. The body absorbs THC more slowly when the person eats or drinks it. In that case, they generally feel the effects after 30 minutes to 1 hour. THC acts on specific brain cell receptors that ordinarily react to natural THC-like chemicals. These natural chemicals play a role in normal brain development and function. Marijuana overactivates parts of the brain that contain the highest number of these receptors. This causes the "high" that people feel. Other effects include:

altered senses (for example, seeing brighter colors)
altered sense of time
changes in mood
impaired body movement

---

[30] Much of the information used here comes from government publication in the public domain. They are cited.

[31] "Medical Marijuana: Clinical Considerations and Concerns," Richard G. Soper, MD, AZ Medicine, Summer 2011 For complete reprints of the original article, contact Dr. Soper at the Center for Behavioral Wellness, 2830 Bransford Ave., Nashville, TN, 37204; phone: 615-292-5747, fax: 615-2925749; email: mdjd@justice.corn.

[32] https://www.drugabuse.gov/publications/drugfacts/marijuana

[33] https://www.drugabuse.gov/publications/drugfacts/marijuana

difficulty with thinking and problem-solving
impaired memory
hallucinations (when taken in high doses)
delusions (when taken in high doses)
psychosis (when taken in high doses)

**Long-Term Effects**

When people begin using marijuana as teenagers, the drug may impair:

thinking
memory
learning functions
how the brain builds connections between the areas necessary for these functions.

Loss of IQ

A study from New Zealand conducted in part by researchers at Duke University showed that people who started smoking marijuana heavily in their teens and had an ongoing marijuana use disorder lost an average of 8 IQ points between ages 13 and 38. The lost mental abilities didn't fully return in those who quit marijuana as adults.

Marijuana use may have a wide range of effects, both physical and mental [34]

Physical Effects

Breathing problems. Marijuana smoke irritates the lungs, and people who smoke marijuana frequently can have the same breathing problems as those who smoke tobacco. These problems include daily cough and phlegm, more frequent lung illness, and a higher risk of lung infections. Increased heart rate. Marijuana raises heart rate for up to 3 hours after smoking. This effect may increase the chance of heart attack. Older people and those with heart problems may be at higher risk.

Mental Effects

Long-term marijuana use has been linked to mental illness in some people, such as:

temporary hallucinations
temporary paranoia
worsening symptoms in patients with schizophrenia—a severe mental disorder with symptoms such as hallucinations, paranoia, and disorganized thinking

---

[34] https://www.drugabuse.gov/publications/drugfacts/marijuana

Marijuana use has also been linked to other mental health problems, such as depression, anxiety, and suicidal thoughts among teens.

How Does Marijuana Affect a Person's Life? [35]

Compared to those who don't use marijuana, those who frequently use large amounts report the following:

lower life satisfaction
poorer mental health
poorer physical health
more relationship problems

People also report less academic and career success. For example, marijuana use is linked to a higher likelihood of dropping out of school. It's also linked to more job absences, accidents, and injuries.

**Can a person overdose on marijuana?**

An overdose occurs when a person uses enough of the drug to produce life-threatening symptoms or death. There are no reports of teens or adults dying from marijuana alone. However, some people who use marijuana can feel some very uncomfortable side effects, especially when using marijuana products with high THC levels. People have reported symptoms such as anxiety and paranoia, and in rare cases, an extreme psychotic reaction (which can include delusions and hallucinations) that can lead them to seek treatment in an emergency room. While a psychotic reaction can occur following any method of use, emergency room responders have seen an increasing number of cases involving marijuana edibles. Some people (especially preteens and teens) who know very little about edibles don't realize that it takes longer for the body to feel marijuana's effects when eaten rather than smoked. So they consume more of the edible, trying to get high faster or thinking they haven't taken enough. In addition, some babies and toddlers have been seriously ill after ingesting marijuana or marijuana edibles left around the house.[36]

**Additional Adverse Side Effects of Marijuana Use Are Many and Include:** [37]

1. Disruptive effect on coordination beyond the period of intoxication which cause increased risk for adverse incidents such as motor vehicle crashes, industrial accidents.

---

[35] https://www.drugabuse.gov/publications/drugfacts/marijuana

[36] https://www.drugabuse.gov/publications/drugfacts/marijuana

[37] Marijuana: Medical Implications, John R. Hubbard, M.D., Ph.d., Sharone E. Franco, M.d., and Emmanuel S. Onaivi, Ph.D., Vanderbilt University School of Medicine, Nashville, Tennessee, American Family Physician.1999 Dec 1;60(9):2583-2588. https://www.aafp.org/afp/1999/1201/p2583.html
https://www.drugabuse.gov/publications/drugfacts/marijuana

2. Physical Adverse Effects include:

Altered body temperature
Altered pulmonary status
Decreased coordination
Decreased cerebral blood flow
Dry mouth
Headache
Increased heart rate
Increased food consumption
Nausea
Nystagmus (involuntary eye movement)
Reduced muscle strength
Tremor

3. Reproductive abnormalities

Abnormal ova
Change in sperm morphology/motility
Chromosomal damage
Decreased libido
Fetal exposure
Gynecomastia
Impotence
Increase in the risk of nonlymphoblastic leukemia in children
Infertility
Lower testosterone levels
Menstrual abnormalities
Prolonged childbirth
Reduced fertility in offspring
Reduced testicular size
Reduction of the size of the fetus and the birth weight

4. Side effects on pre-existing medical conditions

Impairment of pulmonary defenses against infection.
Increase of cognitive deficits
Increased risk of damage to coronary arteries cerebrovascular system
Increased damage to already damaged airways - marijuana smoke has significantly higher tar content than tobacco and has carcinogens and is smoked unfiltered.

5. Side effects caused by marijuana withdrawal

Altered sleep/wake cycles
Behavioral
Decreased appetite
Depressed mood
Increased body temperature
Insomnia
Irritability
Nausea
Perspiration
Physiologic
Restlessness/agitation
Salivation
Sleep
Tremor
Weight loss
Cravings [38]

6. Neuropsychiatric Side Effects

Addictive behaviors
Aggressiveness
Altered libido
Amotivational syndrome
Anxiety and panic
Confusion
Depersonalization
Derealization
Hallucinations
Paranoia
Poor sense of time
Possible suicidal ideation
Sedation
Worsened short-term memory

The neurological disadvantages to using marijuana include:

1. Problems in the domains of attention and memory that persist beyond abstinence
2. Macrostructural brain alterations such as morphometry changes in gray matter tissue and changes in white matter tract integrity such as poorer coherence in white matter fibers.

---

[38] https://www.drugabuse.gov/publications/drugfacts/marijuana

3. Abnormalities of neural functioning such as increased brain activation
4. Changes in neurovascular functioning. [39]

There are neurocognitive disadvantages to using marijuana in the domains of attention and memory that persist beyond abstinence. [40]

Other side effects

Cannabinoids are known to have biphasic effects in that a lower dose may relieve a symptom but a higher dose may make it worse and people vary widely in their response to marijuana and this has not been studied with marijuana. How marijuana is delivered may also affect both the efficacy of its use and number of side effects. Marijuana dispensaries deliver it in elixirs, honeys, baked goods, candies and beverages but there is no reliable data to indicate if these preparations are more efficacious and/or better tolerated. People with chronic medical conditions, the elderly patients and those who are not experienced with marijuana may be more sensitive to side effects. There are also gender differences in response. [41]

**Acute effects of pure THC and high-THC marijuana include:**

Abuse and dependency
Anxiety (including panic attacks),
Cognitive impairment
Confusion
Dizziness,
Dry mouth
Hallucinations and other psychotic-like symptoms
Intoxication (including dysphoria)
Orthostatic hypotension
Psychomotor impairment
Somnolence,
Tachycardia [42]

---

[39] Is CBD Oil Harmful or Healing? What No One is Telling You
https://www.thehealthyhomeeconomist.com/cbd-oil-dangers/#comment-643247

[40] Is CBD Oil Harmful or Healing? What No One is Telling You
https://www.thehealthyhomeeconomist.com/cbd-oil-dangers/#comment-643247

[41] "Medical Marijuana: Clinical Considerations and Concerns," Richard G. Soper, MD, AZ Medicine, Summer 2011 For complete reprints of the original article, contact Dr. Soper at the Center for Behavioral Wellness, 2830 Bransford Ave., Nashville, TN, 37204; phone: 615-292-5747, fax: 615-2925749; email: mdjd@justice.corn.

[42] "Medical Marijuana: Clinical Considerations and Concerns," Richard G. Soper, MD, AZ Medicine, Summer 2011 For complete reprints of the original article, contact Dr. Soper at the Center for Behavioral Wellness, 2830

The Journal of the American Medical Association (JAMA) released an article on cannabinoids for medical use that claimed that there was an increased risk of short-term adverse effects including some serious adverse effects. The most common adverse effects included:

asthenia
balance problems
confusion
dizziness
disorientation
diarrhea
euphoria
drowsiness
dry mouth
fatigue
hallucination
nausea
somnolence
vomiting. [43]

**CBD side effects**

Drug Contraindications

CBD oil may potentially interact in a negative way with anti-epilepsy drugs such as:

1. carbamazepine (Tegretol)
2. phenytoin (Dilantin)
3. phenobarbital (Luminal, Solfoton, Tedral)
4. primidone (anti-seizure) [44]

Research published in the journal Cannabis and Cannabinoid Research shows that more than 40% of children with epilepsy who were given CBD orally had adverse events that included THC like symptoms, The research challenged the widely accepted premise that CBD is not intoxicating. [45]

---

Bransford Ave., Nashville, TN, 37204; phone: 615-292-5747, fax: 615-2925749; email: mdjd@justice.corn.

[43] http://jamanetwork.com/journals/jama/fullarticle/2338251

[44] Is CBD Oil Harmful or Healing? What No One is Telling You
https://www.thehealthyhomeeconomist.com/cbd-oil-dangers/#comment-643247

[45] Is CBD Oil Harmful or Healing? What No One is Telling You
https://www.thehealthyhomeeconomist.com/cbd-oil-dangers/#comment-643247

The most common side effects of CBD can include: [46]

Sleepiness
Decreased appetite
Diarrhea
Change in liver function
Fatigue
Malaise
Asthenia (weakness or lack of energy)
Rash
Insomnia
Sleep disorder
Poor quality sleep
Infections
CBD also interacts with some other seizure medicines.
Nausea or vomiting
Dizziness
Anxiety or depression
Changes in appetite/weight
Psychosis

**Are People with Health and Age-Related Problems More Vulnerable to Marijuana's Risks?**

State-approved medicinal use of marijuana is a fairly new practice. For that reason, marijuana's effects on people who are weakened because of age or illness are still relatively unknown. Older people and those suffering from diseases such as cancer or AIDS could be more vulnerable to the drug's harmful effects, but more research is needed. [47]

---

[46] Medical Marijuana and Epilepsy.
https://www.epilepsy.com/learn/treating-seizures-and-epilepsy/other-treatment-approaches/medical-marijuana-and-epilepsy
https://www.rxlist.com/epidiolex-side-effects-drug-center.htm#professional
https://www.clinicaltrials.gov/ct2/results?term=epidiolex&Search=Search
https://www.greenwichbiosciences.com/products-pipeline/research-trials/clinical-trials

Is CBD Oil Harmful or Healing? What No One is Telling You
https://www.thehealthyhomeeconomist.com/cbd-oil-dangers/#comment-643247

[47] https://www.drugabuse.gov/publications/drugfacts/marijuana-medicine

**Low Birth Weights**

The Colorado School of Public Health reports that there is a 50% increase in low birth weights among women who use marijuana during pregnancy. Low birth weight sets the stage for future health problems including infection and time spent in neonatal intensive care. [48]

**CBD During Pregnancy**

Marijuana exposure crosses the placenta and human and animal studies found that prenatal cannabis exposure influences brain development and can have long-lasting impacts on cognitive functions. If CBD at least in part converts to THC under some conditions, women who ingest CBD for morning sickness or other pregnancy issues should understand that CBD use may mimic using marijuana directly. [49]

**The side effects of second hand smoke or other marijuana exposure in children**

The metabolites in marijuana are detected in young children with exposure to secondhand marijuana smoke. The children who are exposed to the psychoactive compounds in marijuana are at risk for negative health effects. Understanding the negative health consequences of marijuana smoke to children is critical for providers, parents, and policymakers to best protect children from harmful exposures. [50]

The rate of marijuana exposures among children under the age of six increased by 147.5% in the United States between 2000 and 2013 according to a study published in Clinical Pediatrics. Even more disturbing in the states that have legalized "medical" marijuana, the rate rose nearly 610% over that time. The data comes from the National Poison Data System. 75% percent of the children were exposed by ingesting edible marijuana products such as marijuana-infused candy. Clinical effects include drowsiness or lethargy, ataxia [failure of muscle coordination], agitation or irritability, confusion and coma, respiratory depression, and single or multiple seizures. [51]

---

[48] https://www.sciencedaily.com/releases/2018/04/180423125052.htm

[49] Is CBD Oil Harmful or Healing? What No One is Telling You https://www.thehealthyhomeeconomist.com/cbd-oil-dangers/#comment-643247

[50] Detecting biomarkers of secondhand marijuana smoke in young children, Karen M. Wilson, Michelle R. Torok, Binnian Wei, Lanqing Wang, Michelle Robinson, Connie S. Sosnoff & Benjamin C. Blount, Pediatric Research volume 81, pages 589–592 (2017) doi:10.1038/pr.2016.261 https://www.medscape.com/medline/abstract/27911435

[51] http://journals.sagepub.com/doi/full/10.1177/0009922815589912

**The World Health Organization Position on Acute Health Effects of Cannabis Use**

The acute effects of cannabis use has been recognized for many years, and recent studies have confirmed and extended earlier findings. These may be summarized as follows:

1. Cannabis impairs cognitive development (capabilities of learning), including associative processes

2. free recall of previously learned items is often impaired when cannabis is used both during learning and recall periods;

3. Cannabis impairs psychomotor performance in a wide variety of tasks, such as motor coordination, divided attention, and operative tasks of many types; human performance on complex machinery can be impaired for as long as 24 hours after smoking as little as 20 mg of

4. THC in cannabis; there is an increased risk of motor vehicle accidents among persons who drive when intoxicated by cannabis.

**Chronic health effects of cannabis use**

1. Selective impairment of cognitive functioning which include the organization and integration of complex information involving various mechanisms of attention and memory processes.

2. Prolonged use may lead to greater impairment, which may not recover with cessation of use, and which could affect daily life functions.

3. Development of a cannabis dependence syndrome characterized by a loss of control over cannabis use is likely in chronic users.

4. Cannabis use can exacerbate schizophrenia in affected individuals.

5. Epithelial injury of the trachea and major bronchi is caused by long-term cannabis smoking.

6. Airway injury, lung inflammation, and impaired pulmonary defense against infection from persistent cannabis consumption over prolonged periods.

7. Heavy cannabis consumption is associated with a higher prevalence of symptoms of chronic bronchitis and a higher incidence of acute bronchitis than in the non-smoking cohort.

8. Cannabis used during pregnancy is associated with impairment in fetal development leading to a reduction in birth weight. Cannabis use during pregnancy may lead to postnatal risk of rare forms of cancer.

**Emergency care**

In Colorado, increased marijuana use after legalization has been accompanied by an increase in the number of emergency department visits and hospitalizations related to acute marijuana intoxication. Data from the Colorado Hospital Association, a consortium of more than 100 hospitals in the state, shows that the prevalence of hospitalizations for marijuana exposure in patients aged 9 years and older doubled after the legalization of medical marijuana and that emergency department visits nearly doubled after the legalization of recreational marijuana, although these findings may be limited because of stigma surrounding disclosure of marijuana

use in the prelegalization era. However, the same trend is found in the number of civilian calls to the Colorado poison control center. In the years after both medical and recreational marijuana legalization, the call volume for marijuana exposure doubled compared with that during the year before legalization. [52]

Emergency room admissions for marijuana use now exceed those for heroin and are continuing to rise. [53]

**Medical Dangers to Children of Marijuana Use and Exposure**

Marijuana related suicides of young people in colorado

Marijuana is the Number 1 substance now found in suicides of young people in Colorado who are 10-19 years old. Go to the below Colorado website and click on the box that lists "methods, circumstances and toxicology" and then click on the two boxes for 10-19 years olds. The marijuana data will appear. [54]

Toddlers with lung inflammation

In Colorado one in six infants and toddlers hospitalized for lung inflammation are testing positive for marijuana exposure. This has been a 100% increase since legalization (10% to 21%). Non-white kids are more likely to be exposed than white kids.[55]

Teen ER visits

Marijuana related emergency room visits by Colorado teens is substantially on the rise. They see more kids with psychotic symptoms and other mental health problems and chronic vomiting due to marijuana use.[56]

---

[52] Kim HS, Monte AA. Colorado cannabis legalization and its effect on emergency care. Ann Emerg Med. 2016;68:71-75.
https://search.aol.com/aol/search?q=http%3a%2f%2fcolorado%2520cannabis%2520legalization%2520and%2520its%2520effect%2520on%2520emergency%2520care%2e&s_it=loki-dnserror

[53] https://learnaboutsam.org/science

[54]
https://cohealthviz.dphe.state.co.us/t/HSEBPublic/views/CoVDRS_12_1_17/Story1?:embed=y&:showAppBanner=false&:showShareOptions=true&:display_count=no&:showVizHome=no#4)

[55] https://www.sciencedaily.com/releases/2016/04/160430100247.htm

[56]
https://www.reuters.com/article/us-health-marijuana-kids/marijuana-related-er-visits-by-colorado-teens-on-the-rise-id USKBN1HO38A

**Gynecomastia**

Gynecomastia is when there is swelling of breast tissues in males. It is caused by an imbalance of the hormones estrogen and testosterone. According to the Mayo Clinic It can result from the use of marijuana. [57] Males with enlarged breasts may have an increased risk for breast cancer.[58]

**Sexual Dysfunction**

Research on marijuana and sexual health suggests that male smokers could be courting sexual dysfunction. The healthy development and status of male genitalia are also affected by marijuana use. [59]

**Excessive Bleeding after Surgery**

A surgeon notes in a blog that:

> Marijuana is most commonly smoked, with peak onset of the euphoria in about 30 minutes and typically lasting 2-3 hours. The most common and desired reaction is euphoria, but some people will have an unpleasant altered mood, a.k.a dysphoria or even anxiety and agitation. This can lead to untoward cardiovascular effects such as increased in heart rate which can lead to bleeding during and after surgery. There is also increased oxygen consumption by the body which can lower normal blood oxygen level below safe levels during surgery. Typically, the quickest way to obtain the effects of marijuana is to inhale deeply and hold before exhalation. This is what is believed to damage lining of the alveolar cells in the lungs, possibly leading to poor oxygenation during and after surgery. Additionally, smokers have a more reactive airway (coughing) leading to an increased risk of aspiration during and after surgery. Marijuana is also known to increase or potentiate the effects of many medications that we typically use to lower the central nervous system in order to achieve a more relaxed state. This can lead to a deeper level of anesthesia than that is intended with IV sedation. Local anesthesia that is typically used to "numb" the surgical area usually increases the heart rate. This can also be potentiated with the use of marijuana, leading to increased bleeding during and after surgery. [60]

---

57

https://www.mayoclinic.org/diseases-conditions/gynecomastia/symptoms-causes/syc-20351793

58 National Institutes of Health, National Library of Medicine https://medlineplus.gov/ency/article/003165.htm

59 https://www.livescience.com/12825-marijuana-men-sexual-function.html

60 https://www.drmassoomi.com/blog/marijuana-use-and-surgery/
https://www.verywell.com/marijuana-and-surgery-3156981

**Gateway to Other Addictions**

Is marijuana a gateway drug?

Use of alcohol, tobacco, and marijuana are likely to come before use of other drugs. Animal studies have shown that early exposure to addictive substances, including THC, may change how the brain responds to other drugs. For example, when rodents are repeatedly exposed to THC when they're young, they later show an enhanced response to other addictive substances—such as morphine or nicotine—in the areas of the brain that control reward, and they're more likely to show addiction-like behaviors. [61]

99% of people who are addicted to other drugs started with alcohol and marijuana. So, indeed, marijuana use makes addiction to other drugs more likely. [62]

More young people are in treatment for marijuana abuse or dependence than for the use of alcohol and all other drugs. [63]

Long-term studies of high school students and their patterns of drug use show that very few young people use other drugs without first trying marijuana. The risk of using cocaine has been estimated to be more than 104 times greater for those who have tried marijuana than for those who have never tried it. [64]

**Brain Damage**

Marijuana smokers had changes in the blood flow in their brains even after a month of not smoking, according to a study published in Neurology, the scientific journal of the American Academy of Neurology. The findings may explain in part the problems with thinking or remembering found in other studies of marijuana users. [65]

**Strokes**

Marijuana seems to be a risk factor for stroke. It is known to have short-term effects on the cardiovascular system, including speeding the heart rate, raising or lowering blood pressure, and

---

[61] https://www.drugabuse.gov/publications/drugfacts/marijuana

[62] https://learnaboutsam.org/science/

[63] https://learnaboutsam.org/science

[64] Kandel, D. B. Stages in adolescent involvement with drugs. Science, 190:912-914, 1975.

[65] "Marijuana May Affect Blood Flow in Brain" - Reuters, 7 February 2005
https://www.sciencedaily.com/releases/2005/02/050211084701.htm

even elevating the risk of heart attack in the hour after use. However, it's not entirely clear how marijuana may cause a stroke which occurs when blood flow to the brain is cut off and brain tissue begins to die. A sudden constriction of the arteries after smoking the drug may be to blame. "recreational cannabis use appears not to be as harmless as was thought," writes Dr. Dominique Deplanque of the University of Lille in France, "there is a need to improve public information." [66]

**Other studies:**

There is a causal link between marijuana and cerebrovascular events..[67]

Marijuana use may represent a risk factor for stroke in childhood. [68]

Marijuana use is associated with arterial disease such as stroke, and myocardial infarction. [69]

Heavy marijuana use is a risk factor for cardiovascular disease in HIV-infected men ages 40-60, independent of tobacco smoking and other traditional risk factors. [70]

**Infertility**

The increased load of marijuana in the bodies of people who abuse marijuana could flood the natural endocannabinoid-signal systems in reproductive organs and adversely impact fertility and this may explain reports that marijuana smoke drastically reduces sperm production in males. [71]

**Emergency Room Visits Connected to Marijuana**

The Drug Abuse Warning Network (DAWN), a system for monitoring the health impact of drugs, estimated that in 2011, there were nearly 456,000 drug-related emergency department visits in the United States in which marijuana use was mentioned in the medical record (a 21 percent increase over 2009). About two-thirds of patients were male and 13 percent were between the ages of 12 and 17. It is unknown whether this increase is due to increased use,

---

[66] https://forum.drugs.com/latest-drug-related-news/more-evidence-ties-marijuana-stroke-risk-25372.html

[67] https://www.ncbi.nlm.nih.gov/pubmed/25700287

[68] http://pediatrics.aappublications.org/content/113/4/e365

[69] https://www.ncbi.nlm.nih.gov/pubmed/23850313

[70] https://www.ncbi.nlm.nih.gov/pubmed/28449059

[71] "Marijuana Firmly Linked to Infertility" - Scientific American, 22 December 2000 https://www.scientificamerican.com/article/marijuana-firmly-linked-t/

increased potency of marijuana (amount of THC it contains), or other factors. It should be noted, however, that mentions of marijuana in medical records do not necessarily indicate that these emergencies were directly related to marijuana intoxication. [72]

**Cannabinoid Hyperemesis Syndrome**

Studies show that chronic use of marijuana can lead to Cannabinoid Hyperemesis Syndrome (CHS) which is a condition with recurrent bouts of severe nausea, vomiting, and dehydration. CHS usually occurs in people under 50 years of age and with a long history of marijuana use. CHS can lead users to make frequent trips to the emergency room, but can be resolved when a person stops using marijuana. Cannabis hyperemesis syndrome (CHS) which can result in kidney failure. [73]

CHS should be considered as a possible diagnosis in patients with recurrent intractable vomiting and strong history of cannabis abuse. [74] This can be a health problem during pregnancy. [75]

The reader is advised to consult an article published in the December 16, 2016 edition of Gastroenterology.[76] It has many useful details for clinicians about CHS including it phases, diagnosis and treatment. The article abstract states:

---

[72] Source: Center for Behavioral Health Statistics and Quality (CBHSQ). Drug Abuse Warning Network: 2011: Selected Tables of National Estimates of Drug-Related Emergency Department Visits. Rockville, MD: Substance Abuse and Mental Health Services Administration; 2013.
https://www.drugabuse.gov/publications/research-reports/marijuana/what-scope-marijuana-use-in-united-states

[73] Galli JA, Sawaya RA, Friedenberg FK. Cannabinoid Hyperemesis Syndrome. Curr Drug Abuse Rev. 2011;4(4):241-249.

Sorensen CJ, DeSanto K, Borgelt L, Phillips KT, Monte AA. Cannabinoid Hyperemesis Syndrome: Diagnosis, Pathophysiology, and Treatment-a Systematic Review. J Med Toxicol. 2017;13(1):71-87.
https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5330965/

Alaniz VI, Liss J, Metz TD, Stickrath E. Cannabinoid hyperemesis syndrome: a cause of refractory nausea and vomiting in pregnancy. Obstet Gynecol. 2015 Jun;125(6):1484-6.

[74] https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3576702/
Cannabinoid Hyperemesis Syndrome, Curr Drug Abuse Rev. 2011 Dec; 4(4): 241–249.

[75] https://www.ncbi.nlm.nih.gov/pubmed/26592070, Cannabinoid Hyperemesis Syndrome During Pregnancy: A Case Report. J Reprod Med. 2015 Sep-Oct;60(9-10):430-2.
Cannabinoid Hyperemesis Syndrome During Pregnancy: A Case Report.

[76] Cannabinoid Hyperemesis Syndrome, Gastroenterology, December 16, 2016
https://www.uspharmacist.com/article/cannabinoid-hyperemesis-syndrome

ABSTRACT: Marijuana, or cannabis, is commonly thought to be a benign substance without adverse effects; however, cannabinoid hyperemesis syndrome (CHS) is a sequela of chronic cannabis use. Clinicians should strongly suspect CHS in long-term users of cannabis who present with intractable nausea and vomiting and whose symptoms are relieved by bathing in hot water. A lack of response to antiemetics should assist in the diagnosis of CHS. The only treatment to successfully resolve CHS is abstinence from cannabis, although haloperidol is being studied as a potential treatment option. A patient experiencing CHS should be counseled to avoid cannabis because continued use will trigger further symptoms.

Colorado legalized marijuana in 2009 and since then the rate of CHS has doubled. [77]

CHS maybe unrecognized by physicians and this may lead to an extensive and costly patient medical evaluations. CHS may be misdiagnosed as any one of many disorders including pancreatitis or gastroparesis or cyclic vomiting syndrome (CVS). [78]

An ER physician, Dr. Roneet Lev, provided an excellent account of this syndrome in her presentation at the National Press Club. [79]

**More than 65% of Medical Marijuana Users Have Experienced an Overdose**

Many state laws permit high levels of THC, the intoxicating element of marijuana/cannabis. Dr. Scott Novak, senior developmental epidemiologist at RTI International, a nonprofit research institute based in North Carolina, has warned that more than 65 percent of people who use marijuana for medical reasons have experienced an overdose. Patients experience side effects ranging from nausea to hallucinations and end up in hospitals where staff may not recognize the source of the problem and therefore may not provide proper treatment. [80]

---

[77] http://www.bumc.bu.edu/emergencymedicine/files/2016/08/MJ-legalization-and-impact-on-EM-care.pdf

[78] Cannabinoid Hyperemesis Syndrome, Gastroenterology, December 16, 2016
https://www.uspharmacist.com/article/cannabinoid-hyperemesis-syndrome

[79] https://www.c-span.org/video/?444334-1/rep-patrick-kennedy-speaks-marijuana-policy

[80] https://www.c-span.org/video/?444334-1/rep-patrick-kennedy-speaks-marijuana-policy

## INFORMATION ON "MEDICAL" MARIJUANA AND SPECIFIC ILLNESSES [81]

Is marijuana good for: cancer, positive status for human immunodeficiency virus or acquired immune deficiency syndrome, amyotrophic lateral sclerosis, Alzheimer's disease, multiple sclerosis, epilepsy, cachexia, crohn's disease, post-traumatic stress disorder, or neuropathy? A recent article in the Journal of the American Medical Association discusses these illnesses and if marijuana is safe or effective for these illnesses and concludes that the evidence for use for these conditions relies mostly on testimonials instead of adequate and well-controlled clinical studies. In addition for most of these conditions, medicines that have been subjected to the rigorous approval process of the FDA already exist. There is also a concern that the many conditions for which marijuana is approved as a medicine do not have a common etiology, pathophysiology, or phenomenology, thus there is skepticism about a common mechanism of action that is effected by marijuana. [82]

Research shows that very few of those seeking a recommendation for medical marijuana have cancer, HIV/AIDS, glaucoma, or multiple sclerosis; and in most states that permits the use of medical marijuana, less than 2-3% of users report having cancer, HIV/AIDS, glaucoma, MS, or other life-threatening diseases. [83]

### Cancer

Marijuana use is associated with cancer. Marijuana contains 50% more carcinogens than tobacco smoke and marijuana smokers report serious symptoms of chronic bronchitis and other respiratory illnesses. [84]

---

[81] To learn more about medical conditions and marijuana go to:

https://www.drugs.com/sfx/

https://www.webmd.com/a-to-z-guides/drug-side-effects-explained

https://www.fda.gov/Drugs/

https://open.fda.gov/drug/event/

https://www.accessdata.fda.gov/scripts/cder/daf/

[82] Problems With the Medicalization of Marijuana, May 20, 2014, By: Samuel T. Wilkinson and Deepak Cyril De'Souza, MBBS, MD. http://jama.jamanetwork.com/Mobile/article.aspx?articleID=1874073&utm_source=Silverchair%20Information%20Systems&utm_medium=email&utm_campaign=JAMA%3AOnlineFirst05%2F20%2F2014

[83] https://learnaboutsam.org/science/

[84] https://learnaboutsam.org/science

The risk for lung cancer does not appear to be consistently increased by marijuana use, however, three independent studies have shown that the risk for testicular cancer is doubled by regular use.[85]

Marijuana smoke is associated with lung disease and the development of some cancers. High levels of the cannabinoid receptor that is preferentially activated by THC (CB1) correspond to shorter survival in many cancers. [86]

---

[85] Cancer

Ladin DA, Soliman E, Griffin L, Van Dross R. Preclinical and Clinical Assessment of Cannabinoids as Anti-Cancer Agents. Front Pharmacol. 2016;7:361. eCollection 2016.

Testicular Cancer

Lackson et al. Population-based case-control study of recreational drug use and testis cancer risk confirms an association between marijuana use and nonseminomarisk. Cancer 2012; 188:5374-83.

Trabert et al. Marijuana use and testicular germ cell tumors. Cancer 2011; 117:848-53.

Daling JR , et al. Association of marijuana use and the incidence of testicular germ cell tumors. Cancer 2009;115(6):1215-1223.

[86] Carpi S, Fogli S, Polini B, Montagnani V, Podestà A, Breschi MC, Romanini A, Stecca B, Nieri P. Tumor-promoting effects of cannabinoid receptor type 1 in human melanoma cells. Toxicol In Vitro. 2017 Apr;40:272-279. doi: 10.1016/j.tiv.2017.01.018. Epub 2017 Jan 26

Efird JT, Friedman GD, Sidney S, Klatsky A, Habel LA, Udaltsova NV, Van den Eeden S, Nelson LM. The risk for malignant primary adult-onset glioma in a large, multiethnic, managed-care cohort: cigarette smoking and other lifestyle behaviors. J Neurooncol. 2004 May;68(1):57-69.

Lackson et al., 2012, Population-based case-control study of recreational drug use and testis cancer risk confirms an association between marijuana use and nonseminoma risk. Cancer 188:5374-83

Michalski CW, Oti FE, Erkan M, Sauliunaite D, Bergmann F, Pacher P, Batkai S, Müller MW, Giese NA, Friess H, Kleeff J. Cannabinoids in pancreatic cancer: correlation with survival and pain. Int J Cancer. 2008;122(4):742-50. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2225529/pdf/nihms38106.pdf

Suk KT, Mederacke I, Gwak GY, Cho SW, Adeyemi A, Friedman R, Schwabe RF. Opposite roles of cannabinoid receptors 1 and 2 in hepatocarcinogenesis. Gut. 2016;65(10):1721-32. http://gut.bmj.com/content/gutjnl/65/10/1721.full.pdf

Tan WC, et al. Marijuana and chronic obstructive lung disease: a population-based study. CMAJ. 2009;180(8):814-20

Tashkin DP. The respiratory health benefits of quitting cannabis use. Eur Respir J. 2015;46(1):1-4

Marijuana Smoke Contains Higher Levels of Certain Toxins Than Tobacco Smoke, Science Daily, December 18, 2007

The FDA

The U.S. Food and Drug Administration has not approved marijuana as a treatment for cancer. [87]

The National Cancer Institute

> At present, there is insufficient evidence to recommend inhaling Cannabis as a treatment for cancer-related symptoms or cancer treatment–related symptoms or cancer treatment-related side effects; however, additional research is needed. [88]

Marijuana smoke causes cancer

A comprehensive study of the dangers of marijuana smoke by the Hazard Assessment Branch Office of Environmental Health Hazard Assessment, California Environmental Protection Agency concluded that:

> There is evidence from some epidemiological studies of marijuana smoke suggestive of increased cancer risk from both direct and parental marijuana smoking. However, this evidence is limited by validity issues and small numbers of studies for most types of cancer.
>
> Direct marijuana smoking has been statistically significantly associated with cancer of the lung, head and neck, bladder, brain, and testis.

---

Marijuana Smokers Face Rapid Lung Destruction - As Much as 20 Years Ahead of Tobacco Smokers, Science Daily, January 27, 2008

"One Cannabis Joint as Bad as Five Cigarettes" - Reuters UK, 31 July 2007

"Use of Marijuana Impairs Lung Function" - Addiction, 2002; 97:1055-1061

"Study: Smoking Cannabis Causes Damage to Lungs" - Reuters UK

"Respiratory and Immunologic Consequences of Marijuana Smoking"- Journal of Clinical Pharmacology, 2002; 42:71S-81S

"Respiratory Effects of Marijuana and Tobacco Use in a U.S. Sample" - J Gen Intern Med, 2004; 20:33-37

[87] PDQ® Integrative, Alternative, and Complementary Therapies Editorial Board. PDQ Cannabis and Cannabinoids. Bethesda, MD: National Cancer Institute. https://www.cancer.gov/about-cancer/treatment/cam/hp/cannabis-pdq Accessed August 13, 2018

[88] PDQ® Integrative, Alternative, and Complementary Therapies Editorial Board. PDQ Cannabis and Cannabinoids. Bethesda, MD: National Cancer Institute. https://www.cancer.gov/about-cancer/treatment/cam/hp/cannabis-pdq Accessed August 13, 2018

Parental marijuana smoking before or during gestation has been statistically significantly associated with childhood cancer. Childhood cancers that have been associated with maternal marijuana smoking are acute myeloid leukemia, neuroblastoma, and rhabdomyosarcoma. Childhood cancers that have been associated with paternal marijuana smoking are leukemia (all types), infant leukemia (all types), acute lymphoblastic leukemia, acute myeloid leukemia, and rhabdomyosarcoma.

In animal studies, increases in squamous cell papilloma of the skin were reported in mice exposed dermally to marijuana smoke condensate. Malignant mesenchimatous tumors were reported following six subcutaneous injections of marijuana smoke condensate to newborn rats. In a marijuana smoke inhalation study in female rats, benign tumors of the ovary and benign and malignant tumors of the uterus were observed.

There is evidence that marijuana smoke is genotoxic, immunosuppressive, and can alter endocrine function. Studies of 9-THC and other cannabinoids provide evidence for alterations of multiple cell signaling pathways, in endocrine function, and suppression of the innate and adaptive immune response. Prolonged exposures to marijuana smoke in animals and humans cause proliferative and inflammatory lesions in the lung.

Marijuana smoke and tobacco smoke share many characteristics with regard to chemical composition and toxicological activity. [89]

What kind of cancer?

The marijuana advocates claim that marijuana cures cancer. Some states permit its use to treat cancer but it is not limited to any form of cancer. Does this include any form of cancer including skin cancer? Does this include all treatments for cancer or only for chemotherapy? Does it include cancer in children? What about pregnant women who have cancer? Marijuana use by pregnant women can cause causes birth defects.

Marijuana use is now strongly connected to the onset of mental illness such as schizophrenia and depression. Do we want people with cancer to develop depression and other mental illness? The American Psychiatric Association states that current evidence supports, at minimum, a strong association of cannabis use with the onset of psychiatric disorders. "Adolescents are particularly vulnerable to harm, given the effects of cannabis on neurological development." [90]

---

[89] Evidence on the Carcinogenicity of Marijuana Smoke, August 2009, Reproductive and Cancer Hazard Assessment Branch Office of Environmental Health Hazard Assessment, California Environmental Protection Agency, https://oehha.ca.gov/media/downloads/proposition-65/chemicals/finalmjsmokehid.pdf

[90] New APA Position Statement on Marijuana as Medicine, American Psychiatric Association, Date: November 18, 2013, http://www.psychiatry.org/advocacy—newsroom/position-statements.

There are many types of cancer and cancer treatments

There are over 160 types of cancer (see Exhibit A attached). Is marijuana good medicine for all cancers? For example, lets take a look at testicular cancer and an AIDS related cancer Kaposi Sarcoma.

Testicular cancer

According to the American Cancer Society, researchers found a possible link between using marijuana and developing testicular cancer. The study showed that men who had testicular germ cell tumors were about twice as likely to report having ever used marijuana as men without these tumors. [91]

Kaposi Sarcoma

A recent study from Harvard Medical School shows that marijuana use in any form opens the door for Kaposi's Sarcoma. This is a serious life threatening cancer for people with HIV infection. An unintended consequence of using marijuana oil is that it may harm people with HIV/AIDS. [92]

**Medical" Marijuana and Chemotherapy**

Marijuana legalization advocates would have you believe that smoking marijuana is the only alternative for cancer sufferers who are going untreated for the nausea associated with chemotherapy. However, numerous medications and treatments are currently available for this condition. Below is a list of the medications currently available for chemotherapy and some other illnesses.

Serotonin Antagonists
Ondansetron (Zofran)
Granisetron (Kytril)
Tropisetron (Navoban)
Dolasetron
Phenothiazines
Prochlorperazine (Compazine)
Chlorpromazine (Thorazine)
Thiethylperazine (Torecan)
Perphenazine (Trilafon)

---

[91] http://www.cancer.org/cancer/news/study-links-marijuana-use-to-testicular-cancer

[92] "Marijuana Component Opens The Door For Virus That Causes Kaposi's Sarcoma" Science Daily, 2 August 2007 https://www.sciencedaily.com/releases/2007/08/070801112156.htm

Promethazine (Phenergan)
Corticosteroids
Dexamethasone (Decadron)
Methylprednisolone (Medrol)
Anticholinergics
Scopolamine (Trans Derm Scop)
Butyrophenones
Droperidol (Inapsine)
Haloperidol (Haldol)
Domperidone (Motilium)
Benzodiazepines
Lorazepam (Ativan)
Alprazolam (Xanax)
Substituted Benzamides
Metoclopramide (Reglan)
Trimethobenzamide (Tigan)
Alizapride (Plitican)
Cisapride (Propulsid)
Antihistamines
Diphenhydramine (Benedryl) [93]

**Nausea**

Low doses of THC are known to exert an antiemetic effect. However, with heavy and chronic marijuana there is an opposite result. It may be that THC accumulates over time because of its large volume of distribution. It may directly activate CB1 receptors in the enteric nervous system and reduce gastric motility thus increasing the risk of nausea and vomiting. Synthetic cannabinoids which have the effect of THC are hypothesized to cause an overstimulation of the CB1 receptor due to their potent agonist effects. The CB1 receptors are also located in the hypothalamus and thus may induce emesis by impairment of thermoregulation. This leads to the potential relief of symptoms through hot bathing. [94] CHS is discussed in more detail later in this text.

---

[93] Medication list compiled by Dr. Eric Voth, Fellow of the American College of Physicians, SOURCE: 2001 WL 30659 (Appellate Brief) Brief of the Institute on Global Drug Policy of the Drug Free America Foundation; National Families in Action; Drug Watch International; Drug-free Kids: America's Challenge, et al., as Amici Curiae in Support of Petitioner (Jan. 10, 2001, ), U.S. v. Oakland Cannabis Buyers' Cooperative, 121 S.Ct. 1711 (2001); List reconfirmed on May 14, 2006

[94] Cannabinoid Hyperemesis Syndrome, Gastroenterology, December 16, 2016 https://www.uspharmacist.com/article/cannabinoid-hyperemesis-syndrome

## Cardiac Disease

A major new study shows that smoking marijuana dramatically increases the risk of suffering a heart attack and other cardiovascular events. The study showed that over a 5-year period, regular users as young as in their early 30s were 4.6 times more likely to have a cardiac-related illness than those who did not smoke the drug. Even when they corrected for known risk factors, they still found a higher rate of both stroke and heart failure in those patients using marijuana. [95]

---

[95] Pot Smoking Linked to Higher Stroke, Heart Risks: Study,16 Mar 2018 09:55 AM https://www.newsmax.com/health/health-news/pot-smoking-higher-stroke/2018/03/15/id/848861


See also: Blazquez, C. et al. Cannabinoids inhibit the vascular endothelial growth factor pathway in gliomas. Cancer Res 64, 5617-5623, doi:10.1158/0008-5472.CAN-03-3927 (2004).

DeFilippis, E. M. et al. Cocaine and Marijuana Use among Young Adults Presenting with Myocardial Infarction: The Partners YOUNG-MI Registry. Journal of the American College of Cardiology, doi:10.1016/j.jacc.2018.02.047 (2018).

Desai, R. et al. Recreational Marijuana Use and Acute Myocardial Infarction: Insights from Nationwide Inpatient Sample in the United States. Cureus 9, e1816, doi:10.7759/cureus.1816 (2017).

Frost, L., Mostofsky, E., Rosenbloom, J. I., Mukamal, K. J. & Mittleman, M. A. Marijuana use and long-term mortality among survivors of acute myocardial infarction. Am Heart J 165, 170-175, doi:10.1016/j.ahj.2012.11.007 (2013).

Jenkins, K. J. et al. Noninherited risk factors and congenital cardiovascular defects: current knowledge: a scientific statement from the American Heart Association Council on Cardiovascular Disease in the Young: endorsed by the American Academy of Pediatrics. Circulation 115, 2995-3014, doi:10.1161/CIRCULATIONAHA.106.183216 (2007).

Jones, R. T. Cardiovascular system effects of marijuana. Journal of clinical pharmacology 42, 58S-63S (2002).

Sidney, S. Cardiovascular consequences of marijuana use. Journal of clinical pharmacology 42, 64S-70S (2002).

Casier, I., Vanduynhoven, P., Haine, S., Vrints, C. & Jorens, P. G. Is recent cannabis use associated with acute coronary syndromes? An illustrative case series. Acta Cardiol 69, 131-136, doi:10.2143/AC.69.2.3017293 (2014).

Korantzopoulos, P. Marijuana smoking is associated with atrial fibrillation. The American journal of cardiology 113, 1085-1086, doi:10.1016/j.amjcard.2014.01.001 (2014).

Wolff, V. et al. Cannabis-related stroke: myth or reality? Stroke; a journal of cerebral circulation 44, 558-563, doi:10.1161/STROKEAHA.112.671347 (2013).

Reece, A. S., Norman, A. & Hulse, G. K. Cannabis exposure as an interactive cardiovascular risk factor and accelerant of organismal ageing: a longitudinal study. BMJ Open 6, e011891, doi:10.1136/bmjopen-2016-011891 (2016).

Schneider, H. J., Jha, S. & Burnand, K. G. Progressive arteritis associated with cannabis use. Eur J Vasc Endovasc Surg 18, 366-367, doi:10.1053/ejvs.1999.0859 (1999).

Disdier, P. et al. Cannabis arteritis revisited--ten new case reports. Angiology 52, 1-5 (2001).

Ducasse, E. et al. Popliteal artery entrapment associated with cannabis arteritis. Eur J Vasc Endovasc Surg 27, 327-332, doi:10.1016/S1533 (2004).

Kogan, N. M. et al. A cannabinoid quinone inhibits angiogenesis by targeting vascular endothelial cells. Mol Pharmacol 70, 51-59, doi:10.1124/mol.105.021089 (2006).

Netherland, C. D., Pickle, T. G., Bales, A. & Thewke, D. P. Cannabinoid receptor type 2 (CB2) deficiency alters atherosclerotic lesion formation in hyperlipidemic Ldlr-null mice. Atherosclerosis 213, 102-108, doi:10.1016/j.atherosclerosis.2010.07.060 (2010).

Steffens, S. & Pacher, P. Targeting cannabinoid receptor CB(2) in cardiovascular disorders: promises and controversies. Br J Pharmacol 167, 313-323, doi:10.1111/j.1476-5381.2012.02042.x (2012).

Molica, F. et al. Endogenous cannabinoid receptor CB1 activation promotes vascular smooth- muscle cell proliferation and neointima formation. J Lipid Res 54, 1360-1368, doi:10.1194/jlr.M035147(2013).

Slavic, S. et al. Cannabinoid receptor 1 inhibition improves cardiac function and remodelling after myocardial infarction and in experimental metabolic syndrome. J Mol Med (Berl) 91, 811-823, doi:10.1007/s00109-013-1034-0 (2013).

Jouanjus, E., Lapeyre-Mestre, M., Micallef, J., French Association of the Regional, A. & Dependence Monitoring Centres Working Group on Cannabis, C. Cannabis use: signal of increasing risk of serious cardiovascular disorders. J Am Heart Assoc 3, e000638, doi:10.1161/JAHA.113.000638 (2014).

Stanley, C. & O'Sullivan, S. E. Vascular targets for cannabinoids: animal and human studies. Br J Pharmacol 171, 1361-1378, doi:10.1111/bph.12560 (2014).

Kosior, D. A., Filipiak, K. J., Stolarz, P. & Opolski, G. Paroxysmal atrial fibrillation in a young female patient following marijuana intoxication--a case report of possible association. Med Sci Monit 6, 386-389 (2000).

Rezkalla, S. H., Sharma, P. & Kloner, R. A. Coronary no-flow and ventricular tachycardia associated with habitual marijuana use. Annals of emergency medicine 42, 365-369, doi:10.1067/mem.2003.297 (2003).

Fisher, B. A., Ghuran, A., Vadamalai, V. & Antonios, T. F. Cardiovascular complications induced by cannabis smoking: a case report and review of the literature. Emerg Med J 22, 679-680, doi:10.1136/emj.2004.014969 (2005).

Baranchuk, A., Johri, A. M., Simpson, C. S., Methot, M. & Redfearn, D. P. Ventricular fibrillation triggered by marijuana use in a patient with ischemic cardiomyopathy: a case report. Cases J 1, 373, doi:10.1186/1757-1626-1-373 (2008).

Korantzopoulos, P., Liu, T., Papaioannides, D., Li, G. & Goudevenos, J. A. Atrial fibrillation and marijuana smoking. International journal of clinical practice 62, 308-313, doi:10.1111/j.1742- 1241.2007.01505.x (2008).

Diffley, M., Armenian, P., Gerona, R., Reinhartz, O. & Avasarala, K. Catecholaminergic polymorphic ventricular tachycardia found in an adolescent after a methylenedioxymethamphetamineand marijuana-induced cardiac arrest. Crit Care Med 40, 2223-2226, doi:10.1097/CCM.0b013e318250a870 (2012).

There is an emerging literature on serious cardiac events being triggered by potent marijuana use in the young, including some fatalities. In addition, stroke, arrhythmias, and cardiomyopathies are serious outcomes of concern. [96]

## Epilepsy and Seizures

Marijuana has been claimed to help those with epilepsy. CBD is a derivative of marijuana that in its pure form does not have THC.

The American Epilepsy Society urges caution in the use of CBD. They state:

---

Strait, J. B. & Lakatta, E. G. Aging-associated cardiovascular changes and their relationship to heart failure. Heart Fail Clin 8, 143-164, doi:S1551-7136(11)00101-2 [pii]; 10.1016/j.hfc.2011.08.011 (2012).

Sutton-Tyrrell, K. et al. Elevated aortic pulse wave velocity, a marker of arterial stiffness, predicts cardiovascular events in well-functioning older adults. Circulation 111, 3384-3390, doi:CIRCULATIONAHA.104.483628 [pii]; 10.1161/CIRCULATIONAHA.104.483628 (2005).

Jenkins, K. J. et al. Noninherited risk factors and congenital cardiovascular defects: current knowledge: a scientific statement from the American Heart Association Council on Cardiovascular Disease in the Young: endorsed by the American Academy of Pediatrics. Circulation 115, 2995-3014, doi:10.1161/CIRCULATIONAHA.106.183216 (2007).

[96] Cardiac events and fatalities

Jouanjus E, Lapeyre-Mestre M, Micallef J; French Association of the Regional Abuse and Dependence Monitoring Centres (CEIP-A) Working Group on Cannabis Complications*. Cannabis use: signal of increasing risk of serious cardiovascular disorders. J Am Heart Assoc. 2014 Apr 23;3(2):e000638.

Hartung B, Kauferstein S, Ritz-Timme S, Daldrup T. Sudden unexpected death under acute influence of cannabis. Forensic Sci Int. 2014;237:e11-13

Stroke

Singh NN, Pan Y, Muengtaweeponsa S, Geller TJ, Cruz-Flores S. Cannabis-related stroke: case series and review of literature. J Stroke Cerebrovasc Dis. 2012;21(7):555-60.

Arrhythmias,

Goyal H, Awad HH, Ghali JK. Role of cannabis in cardiovascular disorders. J Thorac Dis. 2017;9(7):2079-2092.

Cardiomyopathies

Singh A, Saluja S, Kumar A, Agrawal S, Thind M, Nanda S, Shirani J. Cardiovascular Complications of Marijuana and Related Substances: A Review. Cardiol Ther. 2017 Dec 7. doi: 10.1007/s40119-017-0102-x. [Epub ahead of print]

> Persons with epilepsy must use caution because there is a vast array of other cannabis products, and availability is dependent on individual state laws. Of importance, the purified, pharmaceutical formulation of CBD described above cannot be obtained from a marijuana dispensary; it is only available in research trials at this time. * When patients purchase cannabis-based products from a dispensary, it is extremely important to understand that the product they select may not contain just CBD, but also other phytocannabinoids such as THC (which is psychoactive), pesticides, and other dangerous impurities, of which the concentrations are unknown. Independent laboratory testing of samples of cannabis products have shown that the labels on products in the dispensaries claiming to have a certain percentage of CBD or THC are often incorrect.
>
> While there are anecdotal reports of positive effects of cannabis and/or other CBD products on seizures, it is imperative that we remember that anecdotal reports alone are not sufficient to support treatment decisions. Robust scientific evidence for the use of cannabis itself in the treatment of epilepsy is limited. The lack of information does not mean that cannabis is ineffective for epilepsy, but it just means that providers do not have the required data needed to adequately inform rational clinical decisions for our patients with epilepsy. [97]

This was written in March of 2018. A purified form of CBD was approved by the FDA in June of 2018.

Another epilepsy organization, the Epilepsy Foundation, states:

> When conventional treatments do not work to control seizures, as is the case for roughly 30% of people with epilepsy, it is not unreasonable to consider CBD oil. However, this should only be considered after a thorough evaluation at a specialized epilepsy center to look at whether all possible treatments (including FDA-approved new and add-on medicines, dietary therapy, devices, and surgery) have been reasonably tried. [98]

**Epidiolex - CBD**

In June, 2018, the FDA approved Epidiolex® (cannabidiol, CBD) oral solution for the treatment of seizures associated with two rare, severe forms of epilepsy - Lennox-Gastaut syndrome and Dravet syndrome - in people two years of age or older.

---

[97] https://www.aesnet.org/about_aes/position_statements/AES%20Position%20on%20Medical%20Marijuana

[98] Medical Marijuana and Epilepsy.
https://www.epilepsy.com/learn/treating-seizures-and-epilepsy/other-treatment-approaches/medical-marijuana-and-epilepsy

People using Epidioloex who had increases in their liver enzymes to a level three times or more than normal were also using valproic acid (VPA), a commonly used anti-seizure medication. The levels of VPA were not increased when taken with CBD. Perhaps a part or byproduct of VPA may interact with CBD when it is broken down. This interaction may put some people at increased risk for liver issues. As clobazam (ONFI) is broken down, a major component of the drug may interact with CBD in some people and may be the cause of tiredness that is seen in some people who are on both CBD and ONFI. Clobazam is a benzodiazepine used to treat seizures due to Lennox-Gastaut syndrome in combination with other anti-seizure medicines. [99]

**Marijuana caused seizures**

CBD a derivative of marijuana has been known to cause seizures in children. It is not clear that the seizures are caused by the CBD or contaminants in the CBD. An American Epilepsy Society (AES) study showed that children with epilepsy in Colorado who are given cannabis oils are having developmental regression, intractable vomiting and worsening seizures that can be so severe they have to put the child into a coma to get the seizures to stop. Because these products are unregulated, it is impossible to know if these dangerous adverse reactions are due to the oils or because of contaminants found in these preparations. [100]

A claim for marijuana caused seizures could be supported by sufficient evidence such as:

1. Proof that the overall rates of seizures in clinical trials was higher for marijuana than placebos.
2. That other children had seizures after taking marijuana.
3. That there were reports of seizures related to marijuana
4. That it was biologically possible for marijuana to cause seizures
5. That marijuana's label had warning regarding seizures.
6. That there was lack of alternative explanations for the children's seizures.

Marijuana use could have some anti-seizure property. However, if the psychoactive chemical THC has high levels or marijuana/cannabis is consumed by susceptible individuals, THC may promote seizures. [101]

---

[99] Medical Marijuana and Epilepsy.
https://www.epilepsy.com/learn/treating-seizures-and-epilepsy/other-treatment-approaches/medical-marijuana-and-epilepsy
https://www.rxlist.com/epidiolex-side-effects-drug-center.htm#professional
https://www.clinicaltrials.gov/ct2/results?term=epidiolex&Search=Search

[100] https://calmusa.org/calmcablog/letteramericanepilepticsociety

[101] Katona I. Cannabis and Endocannabinoid Signaling in Epilepsy. Handb Exp Pharmacol. 2015; 231: 285-316.

If marijuana is to be used for children it should be subjected to the same evidence-based review and regulatory oversight by the FDA. As the authors of a recent article in the Journal of the American Medical Association note:

> Potentially therapeutic compounds of marijuana should be purified and tested in randomized, double-blind, placebo- and active-controlled clinical trials. Toward this end, the federal government should actively support research examining marijuana's potentially therapeutic compounds. These compounds should be approved by the FDA (not by popular vote or state legislature), produced according to good manufacturing practice standards, distributed by regulated pharmacies, and dispensed via a conventional and safe route of administration (such as oral pills or inhaled vaporization). [102]

Products claiming to be "high-CBD" have been found to also have significant levels of THC. There is strong evidence that THC can be damaging to very young brains and in some cases may act as a pro-convulsant. Additionally, medicines claimed to be CBD-rich must be produced with assurances of quality and safety from independent scientific bodies like the FDA. [103]

**Medicines other than marijuana for epilepsy**

According to the Epilepsy Foundation, treatments are available that can successfully control seizures for most people with epilepsy. The first treatment is almost always one of the many seizure medications that are now available. Each medicine tends to work better with certain kinds of seizures than for others. If one treatment fails, another may be work better. There are over 80 epilepsy medications (see Exhibit B attached)

**Sleep Apnea**

In April 2018 the American Academy of Sleep Medicine (AASM) issued a position against the use of marijuana or its synthetic extracts as a medicine for the treatment of obstructive sleep apnea (OSA) because the evidence for use of marijuana for OSA is lacking. When the Minnesota Department of Health added OSA to the list of qualifying conditions for which marijuana can be used, AASM expressed concern noting that it was based on short duration studies (3–6 weeks) that provided limited evidence on the safety and efficacy of dronabinol (Marinol) in patients with OSA. Dronabinol is only approved by the FDA for the treatment of refractory nausea and

---

[102] Problems With the Medicalization of Marijuana, May 20, 2014, By: Samuel T. Wilkinson and Deepak Cyril De'Souza, MBBS, MD.
http://jama.jamanetwork.com/Mobile/article.aspx?articleID=1874073&utm_source=Silverchair%20Information%20Systems&utm_medium=email&utm_campaign=JAMA%3AOnlineFirst05%2F20%2F2014

[103] https://learnaboutsam.org/sam-applauds-cbd-agreement-state-new-york-manufacturer-cbd-medicine-children-intractable-epilepsy/
http://www.fda.gov/ForPatients/Approvals/Drugs/ucm405622.htm).

vomiting associated with cancer chemotherapy and for anorexia with weight loss in patients with acquired immunodeficiency syndrome (AIDS). AASM recommended that OSA patients should discuss proven treatment options with a licensed medical provider at an accredited sleep facility. CPAP - continuous positive airway pressure remains the mainstay of treatment for OSA. Their statement notes that:

> Limited evidence citing small pilot or proof of concept studies suggest that the synthetic medical cannabis extract dronabinol may improve respiratory stability and provide benefit to treat OSA. However, side effects such as somnolence related to treatment were reported in most patients, and the long-term effects on other sleep quality measures, tolerability, and safety are still unknown. Dronabinol is not approved by the United States Food and Drug Administration (FDA) for treatment of OSA, and medical cannabis and synthetic extracts other than dronabinol have not been studied in patients with OSA. The composition of cannabinoids within medical cannabis varies significantly and is not regulated. Synthetic medical cannabis may have differential effects, with variable efficacy and side effects in the treatment of OSA. Therefore, it is the position of the American Academy of Sleep Medicine (AASM) that medical cannabis and/or its synthetic extracts should not be used for the treatment of OSA due to unreliable delivery methods and insufficient evidence of effectiveness, tolerability, and safety. OSA should be excluded from the list of chronic medical conditions for state medical cannabis programs, and patients with OSA should discuss their treatment options with a licensed medical provider at an accredited sleep facility. Further research is needed to understand the functionality of medical cannabis extracts before recommending them as a treatment for OSA. [104]

**HIV/AIDS**

Some states permit the use of marijuana as a medicine for people with HIV/AIDS. The HIV virus impairs the immune system in the body. One of the earliest findings in marijuana research was the effect on various immune functions. Cellular immunity is impaired, pulmonary immunity is impaired, and impaired ability to fight infection is now documented in humans. Researchers have found an inability to fight herpes infections and a blunted response to therapy for genital warts in patients who consume marijuana. Abnormal immune function is the cornerstone of problems with AIDS. This impairment leaves the patient unable to fight certain infections and fatal diseases. The potential for these complications exists in all forms of administration of marijuana. [105]

---

[104] http://jcsm.aasm.org/ViewAbstract.aspx?pid=31249

[105] Cabral & Vasquez, Delta-9-Tetrahydrocannabinol suppresses macrophage extrinsic anti-herpes virus activity, Cannabis: Physiopathology, Epidemiology, Detection pp. 137-153 (CRC Press 1993); "Immunological Changes Associated with Prolonged Marijuana Smoking" -American College of Allergy, Asthma and Immunology, 17 November 2004; "Respiratory and Immunologic Consequences of Marijuana Smoking"- Journal of Clinical Pharmacology, 2002; 42:71S-81S; Wu et al., Pulmonary hazards of smoking marijuana as compared with tobacco,

A study from Harvard Medical School shows that marijuana use opens the door for the virus that causes Kaposi's Sarcoma. This is a serious life threatening problem for people with HIV infection. [106]

In addition, contaminants of marijuana smoke are known to include bacteria and fungi. Those at particular risk for the development of infection when these substances are inhaled are people with impaired immunity such as those with HIV/AIDS. [107]

A study done at the University of California, Davis discovered that medical marijuana from 20 dispensaries contained multiple fungal and bacterial contaminants that were highly toxic and can cause serious and sometimes fatal infections among marijuana users. [108] Smoking, vaping or inhaling aerosolized marijuana is a serious health risk, especially for people with chronic conditions such as lymphoma, AIDS or other conditions requiring immunosuppressing therapies. The study revealed a multitude of toxic microorganisms, many of which are known causes of serious lung infections, including Cryptococcus, Mucor, and Aspergillus fungi and Escherichia coli, Klebsiella pneumoniae and Acinetobacter baumannii bacteria.

Marijuana is often used to control nausea, pain and lack of appetite in patients in many serious and chronic conditions, including those immunocompromised from AIDS, chemotherapy, or following a transplant. The inhaling of marijuana in any form delivers a pathway deep into the lungs where infections are most dangerous and can spread quickly through the blood. The pathogens discovered are all dangerous and could lead to serious illness and death. The public may believe that the temperatures reached by smoking marijuana are high enough to kill any fungi or bacteria. This is not accurate and not supported by research.

> Medical, and now recreational, use of marijuana has been foisted on the public via the ballot box without any scientific due diligence regarding its safety or efficacy. We are now beginning to pay the piper for this ignorant miscalculation.[109]

---

NEJM, 1988:318:347-351.

[106] "Marijuana Component Opens The Door For Virus That Causes Kaposi's Sarcoma" -Science Daily, 2 August 2007

[107] Fleisher, Winawer & Zauber, Aspergillosis and marijuana, Annals of Internal Medicine 1991:115:578-579; Ramirez, Acute pulmonary histoplasmosis: newly recognized hazard of marijuana plant hunters, American Journal of Medicine 1990:88:5-60N-5-62N; Taylor et al., Salmonellosis associated with marijuana: a multi state outbreak traced by plasmid fingerprinting, NEJM 1982:306:1249-1254.

[108] UC Davis. Clinical Microbiology and Infection, titled, "A microbiome assessment of medical marijuana." In press. http://www.ucdmc.ucdavis.edu/publish/news/newsroom/11791. March 13, 2018

[109] UC Davis. Clinical Microbiology and Infection, titled, "A microbiome assessment of medical marijuana." In press. http://www.ucdmc.ucdavis.edu/publish/news/newsroom/11791. March 13, 2018

Heavy marijuana use is a risk factor for cardiovascular disease in HIV-infected men ages 40-60, independent of tobacco smoking and traditional risk factors. [110]

**Autism**

The Food and Drug Administration (FDA) has reviewed the use of CBD a marijuana derivative for the treatment of autism. The FDA concluded that such "products are not generally recognized as safe and effective" for autism because "FDA approves a new drug on the basis of scientific data and information demonstrating that the drug is safe and effective." [111]

**Asthma**

The Food and Drug Administration (FDA) has reviewed the use of CBD a marijuana derivative for the treatment of asthma. The FDA concluded that such "products are not generally recognized as safe and effective" for asthma because "FDA approves a new drug on the basis of scientific data and information demonstrating that the drug is safe and effective." [112]

**Alzheimer's disease**

The Food and Drug Administration (FDA) has reviewed the use of CBD a marijuana derivative for the treatment of Alzheimer's disease. The FDA concluded that such "products are not generally recognized as safe and effective" for Alzheimer's disease because "FDA approves a new drug on the basis of scientific data and information demonstrating that the drug is safe and effective." [113]

**Arthritis**

The Food and Drug Administration (FDA) has reviewed the use of CBD a marijuana derivative for the treatment of arthritis. The FDA concluded that such "products are not generally recognized as safe and effective" for arthritis because "FDA approves a new drug on the basis of scientific data and information demonstrating that the drug is safe and effective." [114]

---

[110] https://www.ncbi.nlm.nih.gov/pubmed/28449059

[111] https://www.fda.gov/ICECI/EnforcementActions/WarningLetters/2017/ucm583188.htm

[112] https://www.fda.gov/ICECI/EnforcementActions/WarningLetters/2017/ucm583188.htm

[113] https://www.fda.gov/ICECI/EnforcementActions/WarningLetters/2017/ucm583188.htm

[114] https://www.fda.gov/ICECI/EnforcementActions/WarningLetters/2017/ucm583188.htm

**Bipolar disorder**

The Food and Drug Administration (FDA) has reviewed the use of CBD a marijuana derivative for the treatment of bipolar disorder. The FDA concluded that such "products are not generally recognized as safe and effective" for bipolar disorder because "FDA approves a new drug on the basis of scientific data and information demonstrating that the drug is safe and effective." [115]

**False Medical Claims for CBD**

Various false medical claims for CBD have been made. Below are examples of false claims that have been taken from FDA warning letters to companies that sell CBD. Such claims include using CBD to cure or treat:

Alcoholism
Alzheimer's Disease
Anti-tumor
Arthritis
Asthma
Autism
Bipolar Disorder
Blood pressure and heart rate
Brain protection
Breast Cancer
Breast, glioma, Leukemia, thyroid, colon and lung cancer
Cancer
Cardiovascular disease
Chemotherapy-Induced Hearing Loss
Child cancer
Chronic traumatic encephalopathy. CTE a degenerative brain disease caused by brain trauma.
Colitis
Concussions
Depression
Diabetes
Heart - atherosclerosis
Heart disease
Leukemia
Limits neurological damage - stroke, trauma, Alzheimer's disease and Parkinson's disease.
Liver inflammation
Lung Cancer
Lupus

---

[115] https://www.fda.gov/ICECI/EnforcementActions/WarningLetters/2017/ucm583188.htm

Lyme Disease
Metastatic Breast Cancer
MRSA
Pancreatic cancer.
Parkinson's disease
Pediatric cancer remission
Rheumatoid arthritis
Schizophrenia
Strokes
Therapeutic Effects for the Human Body
Traumatic Brain Injury (TBI) [116]

If you have a client that is using marijuana for any of the above conditions you may have a case if your client is damaged.

**Glaucoma**

A recent article from the Journal of the American Medical Association discusses if marijuana is safe or effective for glaucoma. They note that the evidence for use in glaucoma "relies largely on testimonials instead of adequately powered, double-blind, placebo-controlled randomized clinical trials." Medications for glaucoma that have been subjected to the rigorous approval process of the FDA already exist. [117]

The American Glaucoma Society opposes the use of marijuana

They say that although marijuana does lower intraocular pressure (IOP) temporarily, "IOP lowering is only one consideration in slowing the optic nerve damage of glaucoma. For instance, there is a growing body of evidence that inadequate blood supply to the optic nerve may contribute to glaucoma damage. Since marijuana given systemically is known to lower blood pressure, it is possible that such an effect could be deleterious to the optic nerve in glaucoma, possibly reducing or eliminating whatever beneficial effect that conferred by lowering IOP. For this reason, marijuana, or its components administered systemically, cannot be recommended without a long term trial which evaluates the health of the optic nerve." They conclude their opinion by saying:

---

[116] https://www.fda.gov/ICECI/EnforcementActions/WarningLetters/2017/ucm583188.htm
https://www.fda.gov/ICECI/EnforcementActions/WarningLetters/2017/ucm583197.htm
https://www.fda.gov/ICECI/EnforcementActions/WarningLetters/2017/ucm583205.htm

[117] Problems With the Medicalization of Marijuana, May 20, 2014, By: Samuel T. Wilkinson and Deepak Cyril De'Souza, MBBS, MD.
http://jama.jamanetwork.com/Mobile/article.aspx?articleID=1874073&utm_source=Silverchair%20Information%20Systems&utm_medium=email&utm_campaign=JAMA%3AOnlineFirst05%2F20%2F2014

Summary: Although marijuana can lower the intraocular pressure (IOP), its side effects and short duration of action, coupled with a lack of evidence that it use alters the course of glaucoma, preclude recommending this drug in any form for the treatment of glaucoma at the present time. [118]

American Glaucoma Foundation position

"Marijuana, or its components administered systemically, cannot be recommended without a long-term trial which evaluates the health of the optic nerve." "Although marijuana can lower IOP, its side effects and short duration of action, coupled with a lack of evidence that its use alters the course of glaucoma, preclude recommending this drug in any form for the treatment of glaucoma at the present time." [119]

**Pain**

Dr. Kenneth Finn, a pain medicine specialist who is Board Certified in Pain Medicine and is on the American Board of Pain Medicine and makes several observations on this issue. [120] Pain is the most common diagnosis associated with "medical" marijuana being recommended for medical use. The most common pain related medical diagnoses presenting to primary care physicians are:

spinal disorders (i.e., lower back pain)
arthropathies and related disorders (i.e., knee arthritis)
abdominal pain.

Dr. Finn notes that in common pain conditions there is no widely available or accepted medical literature showing any benefit for pain with the use of dispensary cannabis - a generic plant substance containing multiple components that may have physiologic effects on the body. The Canadian College of Family Physicians drafted potential prescribing guidelines for marijuana and they strongly recommended against marijuana use for acute pain, headache, osteoarthritis, and back pain. A large and increasing body of scientific evidence shows that marijuana use increases rather than decreases non-medical prescription opioid use and the risk of opioid use disorders. It also appears that concurrent use of marijuana and opioids by patients with chronic pain appears

---

[118] http://www.americanglaucomasociety.net/patients/position_statements/marijuana_glaucoma

[119] Marijuana for Glaucoma: Patients Beware! Found at:
https://www.glaucomafoundation.org/news_detail.php?id=161

[120] Finn, K, Current research on marijuana for pain is lacking.
http://www.poppot.org/2017/06/26/current-research-marijuana-pain-lacking/

to indicate a higher risk of opioid misuse. Patients who inhaled marijuana are more likely to meet the criteria for substance abuse disorders (SAD), and are more at risk to be non-adherent with their prescription opioids. Patients with chronic pain enrolled in an interdisciplinary pain program using marijuana may be at higher risk for substance related negative outcomes and they were more likely to report a past history of illicit substance, alcohol, and tobacco use. A recent study of 57,000 people showed that medical marijuana users were more likely to use prescription drugs medically and non-medically and this included pain relievers, stimulants, tranquilizers, and sedatives. Some patients have successfully ended use of their opioids and use marijuana instead but the evidence that marijuana will replace opioids for the larger population is not there. [121]

Options to reduce opiate use include:

1. Medical provider and patient awareness
2. Utilization of prescription drug monitoring programs
3. Widespread availability and use of naloxone
4. Increasing coverage for atypical opioids and abuse deterrent formulations
5. Education and prevention efforts
6. Medication assisted therapies.
7. Monitoring patients closely and perform random drug testing to detect opioid misuse or aberrant behavior
8. Early intervention with alternative therapies when possible such as massage, physical therapy, and acupuncture. [122]

**Multiple Sclerosis**

The MS Society states:

> The question of whether marijuana - produced from the flowering top of the hemp plant, cannabis sativa - should be used for symptom management in multiple sclerosis (MS) is a complex one. It is generally agreed that better therapies are needed for distressing symptoms of MS - including pain, tremor and spasticity - that may not be sufficiently relieved by available treatments. Still, there are uncertainties about the benefits of marijuana relative to its side effects. [123]

---

[121] Why Marijuana Will Not Fix the Opioid Epidemic, by Kenneth Finn, MD https://www.msma.org/uploads/6/2/5/3/62530417/why_marijuana_will_not_fix_the_opioid_epidemic_mayjune_2018_momed.pdf

[122] Why Marijuana Will Not Fix the Opioid Epidemic, by Kenneth Finn, MD https://www.msma.org/uploads/6/2/5/3/62530417/why_marijuana_will_not_fix_the_opioid_epidemic_mayjune_2018_momed.pdf

[123] https://www.nationalmssociety.org/Treating-MS/Complementary-Alternative-Medicines/Marijuana

In a study, a team of scientists reports that marijuana does not improve the often painful symptoms of multiple sclerosis (MS). Their study found that a synthetic form of tetrahydrocannabinol (THC), the active ingredient in marijuana, and a plant extract were no better at relieving severe spasticity or muscle contraction compared with an inactive placebo. Both THC and plant-extract treatment worsened the participants' global impression. [124]

**Randomized Controlled Trials (RCTs) on the Use of Marijuana/cannabis for Some Conditions**

Huntington Disease Dyskinesia

There are no RCTs with cannabis for this condition. [125]

Parkinson's Disease (Levodopa-induced Dyskinesia)

There are no RCTs with cannabis for this condition. [126]

Tourette Syndrome

There are no RCTs with cannabis for this condition. [127]

Respiratory

> Cannabis smoke contains many of the components of tobacco smoke. Smoking a cannabis cigarette can deposit as much as four times the amount of tar in the lungs, compared to smoking a tobacco cigarette. This effect results from the fact that cannabis cigarettes lackfilters and cannabis smokers inhale more deeply and hold their breath longer than tobacco smokers hold theirs. There is no doubt that chronic cannabis smoking is harmful to the lungs. [128]

---

[124] Neurology 2002;58:1404-14O7, "Safety, tolerability, and efficacy of orally administered cannabinoids in MS," J. Killestein, MD, E. L.J. Hoogervorst, MD, M. Reif, PhD, N. F. Kalkers, MD, A. C. van Loenen, PhD, P. G.M. Staats, MA, R. W. Gorter, MD PhD, B. M.J. Uitdehaag, MD PhD and C. H. Polman, MD PhD

[125] Source: Bertha K Madras, PhD, Professor, Dept. of Psychiatry, McLean Hospital, Harvard Medical School

[126] Koppel BS, Brust JC, Fife T, Bronstein J, Youssof S, Gronseth G, Gloss D. Systematic review: efficacy and safety of medical cannabis in selected neurologic disorders: report of the Guideline Development Subcommittee of the American Academy of Neurology. Neurology. 2014 Apr 29: 82(17): 1556-63. PMCID: PMC4011465.

[127] Source: Bertha K Madras, PhD, Professor, Dept. of Psychiatry, McLean Hospital, Harvard Medical School

[128] "Medical Marijuana: Clinical Considerations and Concerns," Richard G. Soper, MD, AZ Medicine, Summer 2011 For complete reprints of the original article, contact Dr. Soper at the Center for Behavioral Wellness, 2830 Bransford Ave., Nashville, TN, 37204

A group of scientists in California studied the health status of 450 daily marijuana smokers but not tobacco. The marijuana smokers had more sick days and more medical visits for respiratory problems and other types of illness than did a similar group who did not smoke either substance. [129]

Marijuana associated with lung disease, cancer

Marijuana smoke is associated with lung disease and the development of some cancers. High levels of the cannabinoid receptor that is preferentially activated by THC (CB1) correspond to shorter survival in many cancers. [130]

---

[129] Polen, M. R; Sidney, S.; Tekawa, I. S.; Sadler. M.; and Friedman, G. D. Health care use by frequent marijuana smokers who do not smoke tobacco. Western Journal of Medicine, 158:596-601. 1993.

[130] Carpi S, Fogli S, Polini B, Montagnani V, Podestà A, Breschi MC, Romanini A, Stecca B, Nieri P. Tumor-promoting effects of cannabinoid receptor type 1 in human melanoma cells. Toxicol In Vitro. 2017 Apr;40:272-279. doi: 10.1016/j.tiv.2017.01.018. Epub 2017 Jan 26

Efird JT, Friedman GD, Sidney S, Klatsky A, Habel LA, Udaltsova NV, Van den Eeden S, Nelson LM. The risk for malignant primary adult-onset glioma in a large, multiethnic, managed-care cohort: cigarette smoking and other lifestyle behaviors. J Neurooncol. 2004 May;68(1):57-69.

Lackson et al., 2012, Population-based case-control study of recreational drug use and testis cancer risk confirms an association between marijuana use and nonseminoma risk. Cancer 188:5374-83

Michalski CW, Oti FE, Erkan M, Sauliunaite D, Bergmann F, Pacher P, Batkai S, Müller MW, Giese NA, Friess H, Kleeff J. Cannabinoids in pancreatic cancer: correlation with survival and pain. Int J Cancer. 2008;122(4):742-50. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2225529/pdf/nihms38106.pdf

Suk KT, Mederacke I, Gwak GY, Cho SW, Adeyemi A, Friedman R, Schwabe RF. Opposite roles of cannabinoid receptors 1 and 2 in hepatocarcinogenesis. Gut. 2016;65(10):1721-32. http://gut.bmj.com/content/gutjnl/65/10/1721.full.pdf

Tan WC, et al. Marijuana and chronic obstructive lung disease: a population-based study. CMAJ. 2009;180(8):814-20

Tashkin DP. The respiratory health benefits of quitting cannabis use. Eur Respir J. 2015;46(1):1-4

Marijuana Smoke Contains Higher Levels of Certain Toxins Than Tobacco Smoke, Science Daily, December 18, 2007

Marijuana Smokers Face Rapid Lung Destruction - As Much as 20 Years Ahead of Tobacco Smokers, Science Daily, January 27, 2008

"One Cannabis Joint as Bad as Five Cigarettes" - Reuters UK, 31 July 2007

"Use of Marijuana Impairs Lung Function" - Addiction, 2002; 97:1055-1061

"Study: Smoking Cannabis Causes Damage to Lungs" - Reuters UK

**The use of marijuana to decrease opiate use**

To many the idea of using marijuana to decrease opioid use is attractive however, there is little data to suggest that may be the case. Smart Approaches to Marijuana has this to say:

> A 2017 study of over 30,000 American adults demonstrated that marijuana users were more than twice as likely to move on to abuse prescription opioids - even when controlling for age, sex, race/ethnicity, other substance use disorders, any mood or anxiety disorder, prior nonmedical opioid use, and family history of drug use disorder, alcohol use disorder, depression, and antisocial personality disorder. (1) Similarly, the CDC also says that marijuana users are three times more likely to become addicted to heroin.(2) And according to the seminal 2017 National Academy of Sciences report, "There is moderate evidence of a statistical association between cannabis use and the development of substance dependence and/or a substance abuse disorder for substances including alcohol, tobacco, and other illicit drugs."(3)
>
> RECENT STUDIES WITH animals also indicate that marijuana use is connected to use and abuse of other drugs. A 2007 Journal of Neuropsychopharmacology study found that rats given THC later self-administered heroin as adults, and increased their heroin usage, while those rats that had not been treated with THC maintained a steady level of heroin intake.(4) Another 2014 study found that adolescent THC exposure in rats seemed to change the rodents' brains, as they subsequently displayed "heroin-seeking" behavior. Youth marijuana use could thus lead to "increased vulnerability to drug relapse in adulthood."(5)
>
> The National Institutes of Health says that research in this area is "consistent with animal experiments showing THC's ability to 'prime' the brain for enhanced responses to other drugs. For example, rats previously administered THC show heightened behavioral response not only when further exposed to THC, but also when exposed to other drugs such as morphine—a phenomenon called cross-sensitization."(6)
>
> ADDITIONALLY, THE MAJORITY of studies find that marijuana users are often polysubstance users, despite a few studies finding limited evidence that some people substitute marijuana for opiate medication. That is, people generally do not substitute marijuana for other drugs. Indeed, the National Academy of Sciences report found that "with regard to opioids, cannabis use predicted continued opioid prescriptions 1 year after injury... Finally, cannabis use was associated with reduced odds of achieving abstinence

---

"Respiratory and Immunologic Consequences of Marijuana Smoking"- Journal of Clinical Pharmacology, 2002; 42:71S-81S

"Respiratory Effects of Marijuana and Tobacco Use in a U.S. Sample" - J Gen Intern Med, 2004; 20:33-37

from alcohol, cocaine, or polysubstance use after inpatient hospitalization and treatment for substance use disorders"[emphasis added].(7) Moreover, a three-year 2016 study of adults also found that marijuana compounds problems with alcohol. Those who reported marijuana use during the first wave of the survey were more likely than adults who did not use marijuana to develop an alcohol use disorder within three years.(8) Similarly, alcohol consumption in Colorado has increased slightly since legalization.(9) [131]

**Marijuana as a Treatment for Opiate Addiction. What are the physical and behavioral adverse effects of using "medical" marijuana while in treatment for opiate addiction?**

A survey of treatment professionals by the author of this text provided the following problems they saw with allowing people in treatment for opiate addiction to use marijuana.

1. Memory defect (short and long term)– how are they to remember compliance issues and new problem solving?
2. Marijuana use masks other mental health issues – anxiety, PTSD, Bipolar Disorder
3. Marijuana use impacts the brain, creates a delay in learning skills to NOT have substance use in life.
4. In order for change to occur, person must acknowledge loss of control - how can someone do this when control is still lost with marijuana?

---

[131] Marijuana & Other Drugs: A Link We Can't Ignore
https://learnaboutsam.org/wp-content/uploads/2017/09/27Sep2017-opioids-one-pager.pdf

1. Olfson M., et al. Cannabis Use and Risk of Prescription Opioid Use Disorder in the United States. Am J Psychiatry 2017. https://doi.org/10.1176/appi.ajp.2017.17040413.
2. Centers for Disease Control. Today's heroin epidemic Infographics more people at risk, multiple drugs abused. CDC, 7 July 2015.
3. National Academies of Sciences, Engineering, and Medicine; Health and Medicine Division; Board on Population Health and Public Health Practice; Committee on the Health Effects of Marijuana: An Evidence Review and Research Agenda ("2017 NAS Report").
4. Ellgren, Maria et al. "Adolescent Cannabis Exposure Alters Opiate Intake and Opioid Limbic Neuronal Populations in Adult Rats." Neuropsychopharmacology 32.3 (2006): 607–615.
5. Stropponi, Serena et al. Chronic THC during adolescence increases the vulnerability to stress-induced relapse to heroin seeking in adult rats. European Neuropsychopharmacology Volume 24 , Issue 7 (2014), 1037 - 1045.
6. "Is marijuana a gateway drug?" National Institute on Drug Abuse.Jan. 2017. See also Panlilio LV, Zanettini C, Barnes C, Solinas M, Goldberg SR. Prior exposure to THC increases the addictive effects of nicotine in rats. Neuropsychopharmacol Off Publ Am Coll Neuropsychopharmacol. 2013;38(7):1198-1208; Cadoni C, Pisanu A, Solinas M, Acquas E, Di Chiara G. Behavioural sensitization after repeated exposure to Delta 9-tetrahydrocannabinol and crosssensitization with morphine. Psychopharmacology (Berl). 2001;158(3):259-266.
7. 2017 NAS report.
8. Weinberger AH, Platt J, Goodwin RD. Is cannabis use associated with an increased risk of onset and persistence of alcohol use disorders? A three-year prospective study among adults in the United States. Drug Alcohol Depend. February 2016.
9. Rocky Mountain HIDTA Investigative Support Center Strategic Intelligence Unit. The Legalization of Marijuana in Colorado: The Impact, Volume 4. Sept. 2016 (citing CO Department of Revenue)

5. Changes in coordination, mood swings, memory/learning problems

6. Marijuana use deters the return to normal brain functioning and it creates a continued drive for more substances and stimuli in the pleasure seeking area of the brain.

7. Marijuana use is a-motivational – knocks out drive and ambition

8. Continued use maintains Arrested Development – low emotional maturity – the maturity level is stumped when start using substances

9. Recovery – means not using drugs

10. THC suppresses neurons in information processing system of the hippocampus, the part of the brain that is crucial for learning memory and integration of sensory experiences with emotions and motivations. Learned behaviors, which depend on the hippocampus, deteriorate after chronic exposure

11. Because marijuana use impacts learning a person falls behind in accumulating intellectual, job, or social skills. This can directly translate to need for more treatment both with intensity and length

12. Users have trouble sustaining and shifting their attention in and registering, organizing and using information.

13. Increase risk of motor vehicle/work accidents

**Post-traumatic Stress Disorder**

PTSD patients who used marijuana users were found to make less progress in overcoming their condition and were more likely to become violent. Wilkinson ST, Stefanovics E, Rosenheck RA. Marijuana use is associated with worse outcomes in symptom severity and violent behavior in patients with posttraumatic stress disorder. [132]

Marijuana can trigger violence in those with PTSD and make PTSD worse. [133]

The Veterans Administration states that "controlled studies have not been conducted to evaluate the safety or effectiveness of medical marijuana for PTSD. Thus, there is no evidence at this time that marijuana is an effective treatment for PTSD. In fact, research suggests that marijuana can be harmful to individuals with PTSD. [134]

---

[132] J Clin Psychiatry. 2015;76(9):1174-1180.

[133] Wilkinson ST, Stefanovics E, Rosenheck RA. Marijuana use is associated with worse outcomes in symptom severity and violent behavior in patients with posttraumatic stress disorder. J Clin Psychiatry. 2015 Sep;76(9):1174-80.

Friedman A, Glassman K, Terras A Violent Behavior as Related to Marijuana and Other Drugs, by Albert Journal of Addictive Diseases, Vol 20(1), 2001,pp. 49-72. Marijuana users nearly as likely to engage in violent behaviors as crack users.

[134] https://www.ptsd.va.gov/professional/co-occurring/marijuana_use_ptsd_veterans.asp

The Vermont Department of Health rejected political efforts to add PTSD to the list of "qualifying conditions" for state-sanctioned use of marijuana. In January 2015, the department reported "Marijuana is not an evidence-based treatment for PTSD and in fact has been shown to interfere with otherwise effective, evidence-based cognitive behavioral therapy protocols. [135]

The American Psychiatric Association

After reviewing the medical literature, the APA released a position statement: "Because of the lack of any credible studies demonstrating clinical effectiveness, the APA cannot endorse the use of medical marijuana for the treatment of post-traumatic stress disorder (PTSD). The Council on Research and Quality Care reviewed available evidence regarding the use of marijuana in the treatment of PTSD and concluded that no published evidence of sufficient quality exists in the medical literature to support the practice." [136]

Mental Health

Marijuana use can cause impairment of memory, attention, motor skills, reaction time, and the integration of complex information and impaired cognition and other neurological damage. * Based on recent studies we know the following:

Psychosis

See the attached paper on Marijuana and Mental Illness and Brain Damage.

*** About the author**

David G. Evans, Esq., is Senior Counsel for the Cannabis Industry Victims Educating Litigators (CIVEL) who educate lawyers on how to make the marijuana industry accountable to their many victims. Mr. Evans was a plaintiff's litigator in personal injury and employment law cases. Attorneys who desire more information can contact Mr. Evans at seniorcounsel@civel.org. The CIVEL website is: www.civel.org

Before opening up his law practice in 1992, he was a Research Scientist in the Data Analysis and Epidemiology Services Unit, Division of Alcoholism and Drug Abuse, New Jersey Department of Health. He analyzed legal and regulatory requirements regarding: drug and alcohol abuse, research and data collection, courts, criminal justice, domestic violence, drug-free workplaces, juveniles, confidentiality, treatment, drug testing, AIDS, drug use forecasting, discrimination.

---

[135] http://drthurstone.com/wp-content/uploads/2015/05/PTSD-MJ-final-for-pdf-1.9.15.pdf

[136] http://drthurstone.com/wp-content/uploads/2015/05/Position-Statement-on-MJ-as-Treatment-for-PTSD.pdf

DISCLAIMER OF LEGAL OR MEDICAL ADVICE

This should not be considered legal or medical advice. This is for informational purposes only. Use of and access to these materials does not in itself create an attorney - client, or any professional relationship, between David G. Evans and CIVEL and the user or reader. Mr. Evans or CIVEL cannot vouch for any study cited herein since they did not do the study. The readers should consult the study and make their own interpretation as to its accuracy. Please also be advised that case law and statutory and regulatory laws cited herein may have been amended or changed by the time you read this.

**EXHIBIT A**

**Types of Cancer Listed by the National Cancer Institute** [137]

Acute Myeloid Leukemia (AML)
Acute Lymphoblastic Leukemia (ALL)
Adrenocortical Carcinoma
AIDS-Related Lymphoma
AIDS-Related Cancers
Anal Cancer
Appendix Cancer
Astrocytomas
Atypical Teratoid/Rhabdoid Tumor, Central Nervous System
Basal Cell Carcinoma
Bile Duct Cancer
Bladder Cancer
Bone Cancer
Brain Tumor
Brain Stem Glioma
Brain and Spinal Cord Tumors Treatment Overview
Brain Stem Glioma
Breast Cancer
Bronchial Tumors
Burkitt Lymphoma - see Non-Hodgkin Lymphoma
Burkitt - see Non-Hodgkin Lymphoma
Carcinoid Tumor
Carcinoma of Unknown Primary
Cardiac (Heart) Tumors
Central Nervous System Embryonal Tumors
Central Nervous System Atypical Teratoid/Rhabdoid Tumor
Central Nervous System Germ Cell Tumors
Central Nervous System
Cervical Cancer
Childhood Brain Stem
Cholangiocarcinoma
Chordoma
Chronic Lymphocytic (CLL)
Chronic Myeloproliferative Neoplasms
Chronic Myelogenous Leukemia (CML)
Chronic Lymphocytic Leukemia (CLL)
Colon Cancer

---

[137] http://www.cancer.gov/types

Colorectal Cancer
Craniopharyngioma
Cutaneous T-Cell - see Mycosis Fungoides and SÈzary Syndrome
Ductal Carcinoma In Situ (DCIS)
Embryonal Tumors, Central Nervous System
Endometrial Cancer
Ependymoma
Epithelial
Esophageal Cancer
Esthesioneuroblastoma
Ewing Sarcoma
Ewing Sarcoma Family of Tumors
Extracranial Germ Cell Tumor
Extragonadal Germ Cell Tumor
Eye Cancer
Fallopian Tube Cancer
Fibrous Histiocytoma of Bone, Malignant, and Osteosarcoma
Gallbladder Cancer
Gastric (Stomach) Cancer
Gastrointestinal Carcinoid Tumor
Gastrointestinal Stromal Tumors (GIST)
Germ Cell Tumor
Gestational Trophoblastic Disease
Glioma - see Brain Tumor
Hairy Cell
Hairy Cell Leukemia
Head and Neck Cancer
Heart Cancer
Hepatocellular (Liver) Cancer
Histiocytosis, Langerhans Cell
Hodgkin Lymphoma
Hodgkin
Hypopharyngeal Cancer
Intraocular Melanoma
Islet Cell Tumors, Pancreatic Neuroendocrine Tumors
Kaposi Sarcoma
Kidney
Langerhans Cell Histiocytosis
Laryngeal Cancer
Leukemia
Lip and Oral Cavity Cancer
Liver Cancer (Primary)
Low Malignant Potential Tumor

Lung Cancer
Lymphoma
Macroglobulinemia, Waldenström – see Non-Hodgkin Lymphoma
Male Breast Cancer
Malignant Fibrous Histiocytoma of Bone and Osteosarcoma
Melanoma
Merkel Cell Carcinoma
Mesothelioma, Malignant
Metastatic Squamous Neck Cancer with Occult Primary
Midline Tract Carcinoma Involving NUT Gene
Mouth Cancer
Multiple Myeloma/Plasma Cell Neoplasm
Multiple Endocrine Neoplasia Syndromes
Mycosis Fungoides
Myelodysplastic Syndromes
Myelodysplastic/Myeloproliferative Neoplasms
Myelogenous Leukemia, Chronic (CML)
Myeloid Leukemia, Acute (AML)
Myeloma, Multiple
Myeloproliferative Neoplasms, Chronic
Nasal Cavity and Paranasal Sinus Cancer
Nasopharyngeal Cancer
Neuroblastoma
Non-Hodgkin
Non-Small Cell Lung Cancer
Non-Small Cell
Nonmelanoma
Oral Cancer
Oropharyngeal Cancer
Osteosarcoma and Malignant Fibrous Histiocytoma of Bone
Osteosarcoma (Bone Cancer)
Ovarian Cancer
Pancreatic Cancer
Pancreatic Neuroendocrine Tumors (Islet Cell Tumors)
Papillomatosis
Paraganglioma
Paranasal Sinus and Nasal Cavity Cancer
Parathyroid Cancer
Penile Cancer
Pharyngeal Cancer
Pheochromocytoma
Pituitary Tumor
Plasma Cell Neoplasm/Multiple Myeloma

Pleuropulmonary Blastoma
Pregnancy and Breast Cancer
Primary CNS Lymphoma
Primary Peritoneal Cancer
Primary Central Nervous System (CNS)
Prostate Cancer
Rectal Cancer
Renal Cell
Renal Pelvis and Ureter, Transitional Cell Cancer
Retinoblastoma
Rhabdomyosarcoma
Salivary Gland Cancer
Sarcoma
Sézary Syndrome
Skin Cancer
Small Intestine Cancer
Small Cell Lung Cancer
Small Cell
Soft Tissue
Soft Tissue Sarcoma
Squamous Neck Cancer with Occult Primary, Metastatic
Squamous Cell Carcinoma - see Skin Cancer (Nonmelanoma)
Stomach (Gastric) Cancer
T-Cell Lymphoma, Cutaneous - see Mycosis Fungoides and Sezary Syndrome
Testicular Cancer
Throat Cancer
Thymoma and Thymic Carcinoma
Thyroid Cancer
Transitional Cell Cancer of the Renal Pelvis and Ureter
Unusual Cancers of Childhood
Ureter and Renal Pelvis, Transitional Cell Cancer
Urethral Cancer
Uterine Cancer, Endometrial
Uterine Sarcoma
Vaginal Cancer
Vascular Tumors
Vulvar Cancer
Waldenström Macroglobulinemia – see Non-Hodgkin Lymphoma
Wilms Tumor and Other Childhood Kidney Tumors

**EXHIBIT B**

Medications for epilepsy [138]

Aptiom
Ativan
Banzel
Brivaracetam
Carbamazepine-XR
Carbamazepine
Carbatrol
Carnexiv
Clobazam
Clonazepam
Convulex
Depacon
Depakene
Depakine
Depakote
Depakote ER
Diastat
Diazepam
Diazepam
Dilantin
Divalproex Sodium-ER
Divalproex Sodium
Epanutin
Epitol
Epitril
Epival
Eslicarbazepine Acetate
Ethosuximide
Ezogabine
Felbamate
Felbatol
Frisium

---

[138] Reviewed By: Joseph I. Sirven, MD and Patricia O. Shafer, RN, MN on Wednesday, March 19, 2014

https://www.epilepsy.com/learn/treating-seizures-and-epilepsy/seizure-medication-list

Fycompa
Gabapentin
Gabitril
Inovelon
Keppra XR
Keppra
Klonopin
Lacosamide
Lamictal
Lamotrigine
Levetiracetam
Levetiracetam XR
Lorazepam
Lyrica
Mysoline
Neurontin
Onfi
Orfiril
Oxcarbazepine
Oxtellar XR
Perampanel
Phenobarbital
Phenobarbital
Phenytek
Phenytoin
Potiga
Pregabalin
Primidone
Qudexy XR
Rivotril
Roweepra
Rufinamide
Sabril
Tegretol XR
Tegretol
Tiagabine Hydrochloride
Topamax
Topiramate XR
Topiramate
Trileptal
Trokendi XR
Valium
Valporal

Valproic Acid
Valprosid
Vigabatrin
Vimpat
Zarontin
Zonegran
Zonisamide