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**A Study on Passing a Law Legalizing the Use of Organic Cannabis
Exclusively for Medicinal Purposes.**

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I. BACKGROUND

Cannabis

Cannabis is a generic term used to denote the several psychoactive preparations of the plant *Cannabis sativa*. The major psychoactive constituent in cannabis is Δ^9 -tetrahydrocannabinol (THC). Compounds which are structurally similar to THC are referred to as cannabinoids. In addition, a number of recently identified compounds that differ structurally from cannabinoids nevertheless share many of their pharmacological properties. The Mexican term 'marijuana' is frequently used in referring to cannabis leaves or other crude plant material in many countries. The unpollinated female plants are called *hashish*. Cannabis oil (hashish oil) is a concentrate of cannabinoids obtained by solvent extraction of the crude plant material or of the resin.¹

Cannabis is an annual plant and can be cultivated via seed or vegetative cuttings. If grown in open sunny environments in well-drained soil with ample nutrients and water, the plant will reach up to 5 metres in height in a four- to six-month growth season. A large female plant can produce over one kilogram of seed. This completes the natural four to six month life cycle. If birds or rodents do not consume the seeds, they may germinate the following spring. Cannabis seeds are a balanced source of essential fatty acids, and easily digestible protein. They are usable as human food or animal feed.² The psychoactive component of cannabis, Δ^9 -THC (Δ^9 -tetrahydrocannabinol), is produced in resin glands that adorn the surface of Cannabis leaves. When resin gland development commences, the medically important cannabinoids and the associated aromatic terpenoids begin to appear. Solitary resin glands most often form at the tips of slender stalks which form as extensions of

¹Scq.ubc.ca, (2005). *HALF BAKED SCIENCE: A PRIMER ON MEDICINAL CANNABIS* | SCQ. [online] Available at: <http://www.scq.ubc.ca/half-baked-science-a-primer-on-medicinal-cannabis/> [Accessed 20 May 2015].

² Ibid.

the plant surface. The cluster of one- or two-dozen head cells atop each stalk secrete aromatic terpenoid-containing resin with a very high percentage of cannabinoids (> 80%), which collects under a thin waxy membrane surrounding the secretory head cells. Because psychotropic cannabinoids have high lipid solubility and low water solubility, they were long thought to owe their pharmacological properties to an ability to perturb the phospholipids constituents of biological membranes.³

History

The use of cannabis has existed over ten thousand years ago and is one the oldest crops used for cultivation. It was cultivated in China as early as 4000 BC. The ancient Chinese used it to make rope, cloth and even paper.⁴ The Pen Ts'ao, one of the world's first pharmacy books, published in China around 2800 BC, recommends hemp as a remedy for just about everything including absentmindedness. The first recorded use of cannabis as a medicine was in China, by a Chinese Emperor Shen- Nung who discovered marijuana's healing properties and used it to cure constipation, female disorders, malaria, rheumatism and other health problems.⁵

Most cultures viewed Marijuana as a gift for its versatile uses, it was used during ceremonies, at which time it was burned as incense, ingested for deep meditative, smoked for pleasure, or worn as cloths during these ceremonies. Hemp is known to be used for hempen fibers, oil from the seeds, seeds for food, a medicine and for its psychoactive substances. The earliest references to its psychoactive properties appear in the Atharva-Veda, a sacred Indian text dating back to 2000 BC. In India, cannabis has been used for lowering fevers, inducing sleep,

³ Ibid.

⁴Nemčok, Ján, (2013). *Legalization of Medical Cannabis. Study Guide* | WHO. [online] Available at: http://cssmun.weebly.com/uploads/1/6/6/2/16623356/who_-_study_guide.pdf [Accessed 20 May 2015].

⁵*HALF BAKED SCIENCE: A PRIMER ON MEDICINAL CANNABIS*

stimulating appetite or improving digestion. In Africa it was used for dysentery, malaria, and other fevers.⁶

In Europe, the Greek traveler Herodotus (circa 500 BC) wrote of the Scyth warriors purifying themselves in steam baths filled with smoke from burning hemp seeds. The Greeks and Romans cultivated hemp for its fibres, seeds, and medicinal applications, although there are a few references to its use as a social lubricant at banquets “to promote hilarity and enjoyment”.⁷

Throughout the Middle Ages and into the Elizabethan era, hemp was grown in Europe and in Britain, where it fulfilled the massive demand of the British Navy. While the therapeutic properties of cannabis were being all but ignored by the Europeans, in India, entire systems of medicine were being built up around it. The herb’s intoxicating effect was very closely tied to its medicinal use. Because of its psychoactive properties it was prized more than ordinary medicines. It was prescribed for a variety of ailments, including headaches, mania, insomnia, rheumatism, menstrual pain and tuberculosis.⁸

The English clergyman Robert Burton was famous for his work *The Anatomy of Melancholy*, where he mentioned the use of cannabis as depression treatment. *The New English Dispensatory* (1764), advises for skin inflammation applying hemp roots, which was already popular in Eastern Europe. But it was not until 1611, where hemp was first brought to North America by Puritans (Jamestown Settlers) where it was firstly cultivated in America for main purpose to produce hemp fiber, an important export.⁹

In 1762, “Virginia awarded bounties for hemp culture and manufacture, and imposed

⁶Nemčok, *Legalization of Medical Cannabis. Study Guide*

⁷HALF BAKED SCIENCE: A PRIMER ON MEDICINAL CANNABIS

⁸Nemčok, *Legalization of Medical Cannabis. Study Guide*

⁹ Ibid.

penalties on those who did not produce it." Even the first presidents of the United States, George Washington and Thomas Jefferson have noted in their diaries that they grow hemp on their farms. Washington's diary indicates that he grew hemp at Mount Vernon, and his plantation lasted about 30 years. Throughout the diary he describes about the quality of seeds and importance of cultivating these seeds. Both Washington and Jefferson disliked tobacco, thus enjoying smoking Marijuana, but there is no hard evidence to support it. Jefferson was a promoter of hemp and used marijuana as currency when money from the government was in short supply in 1781. Moreover, he believed that marijuana is a superior crop to tobacco because it was easier to cultivate than tobacco. It was the start of the boom for the marijuana use as a narcotic.¹⁰

In 1799, Napoleon's forces invaded Egypt and with their scientific expedition team, they bring back cannabis to France. The cannabis was found to have sedative and pain relieving effects and quickly became accepted in Western medicine. In 1830 was a significant year for medical marijuana because of the first Western physician to take an interest on cannabis William Brooke O'Shaughnessy, a surgeon with the British East India Company, and professor at the University of Calcutta, who observed cannabis usage in India. According to his observation he was impressed with its muscle-relaxant properties after giving animals and patients suffering from rabies, rheumatism, epilepsy a tincture of hemp, a solution of cannabis in alcohol which was taken orally. When he returned to England in 1842, he reintroduced cannabis as a medicine to pharmacists. His contemporary, Jean Joseph Moreau de Tours, a French psychologist, proposed using cannabis as a means to treat mental illness. Interest in cannabis as a medicine spread from Europe to America, and very quickly preparations of cannabis became widely available. The famous physician Sir John Russell Reynolds prescribed it to Queen Victoria for menstrual cramps. Needless to say, its intoxicating nature didn't remain a secret for very long, and many artists and intellectuals of the time readily embraced it. Soon doctors in Europe and United States started to use cannabis for variety of physical conditions such as muscle spasm, menstrual cramps, and sedative to induce sleep. Marijuana became very popular in many medicinal products and was sold openly in public pharmacies in the nineteenth century. It

¹⁰ Ibid.

became a fad in the West, mostly France and also United States. However, in the late nineteenth century, new drugs such as aspirin, chloral hydrate, and barbiturates were introduced as more stable and more reliable than *Cannabis indica*. Because of Cannabis's unpredictable responses after a variety of applications on individuals, Cannabis was hastened to be taken away from pharmacies as a medicine. But the new drugs in the United States had tremendous disadvantages, thousands of people died from bleeding from aspirin effects and barbiturates have even far more dangerous effects. Therefore, most of doctors turned back to cannabis. After the Mexican Revolution in 1910, Mexicans immigrated to United States and introduce recreational use of marijuana to the American culture. That is when Anti-drug campaigners started to act and President Wilson signs the Harrison Act to control the manufacture of opium and regulated the international trade. In the Harrison Act, it states that opium can be imported or exported only for medicinal purposes and impose a special tax upon all persons who sell and distribute opium or coca leaves. Moreover, The Harrison Act states that opium can only be consumed after a prescription by a physician. However, it does not apply to marijuana.¹¹

Until the early twentieth century, cannabis was legal and found common use as an everyday medicine. Doubts about the drug began to surface when, at the Second Annual Opiates Conference in 1924, an Egyptian representative complained that workers preferred to lie around smoking hashish than do anything constructive. In 1925, the Dangerous Drugs Act became law, and non-medicinal cannabis was made illegal in Britain. Canada followed suit and banned all forms of cannabis in 1927. Cannabis was added to the list of prohibited drugs “Dangerous Drugs Act in 1928” of the United Kingdom in 1929.¹²

In 1937, with 28 cannabis pharmaceuticals on the American market, the US government effectively criminalized cannabis by passing the Marihuana Tax Stamp Act. Marijuana Tax Act, a national campaign against marijuana states to criminalize marijuana and restrict possession of the drug to individuals who paid excise tax for medical and industrial uses. “After the passage of the

¹¹HALF BAKED SCIENCE: A PRIMER ON MEDICINAL CANNABIS

¹²Nemčok, *Legalization of Medical Cannabis. Study Guide*

Act, prescriptions of marijuana was declined because doctors generally decided it was easier not to prescribe marijuana than to deal with the extra work imposed by the new law."¹³

After 1940 when it became possible to study chemical relatives of tetrahydrocannabinol that might have proved cannabis more stable and find specific effects, it was impossible due to the Marijuana Tax Act of 1937 were it prohibited any such experimentation.¹⁴

In 1938-1944, LaGuardia's Reports states that the practice of smoking marijuana does not lead to addiction in the medical sense of the words, nor it leads to any other drugs as morphine or heroin addiction. The publicity concerning the catastrophic effects of smoking marijuana in New York City is unfounded.¹⁵

Timeline of Cannabis laws:

Boggs Acts, 1951, sets mandatory prison sentences for drug-related offences including marijuana. Narcotics Control Act, 1956, sets stricter mandatory sentences for drug related offenses. A first offence for marijuana possessions carrying minimum sentence of 2-10 years with fine up to \$20,000.

In the 1961 UN single convention on Narcotic Drugs, Cannabis is classified under Schedule I, the strictest classification (cannabis extracts and tinctures) and Schedule IV, a stricter subset of Schedule I (cannabis and cannabis resin except cannabis extracts and tinctures).

1970, Controlled Substances Act classifies marijuana as Schedule 1 with high potential for abuse, no current acceptance of medical use in US, and lack of acceptance for safety use of the drug or other substance under medical supervision. National Organization for the Reform of Marijuana Laws (NORML) founded to end marijuana prohibition.

In the 1971 UN convention on Psychotropic Substances, the psychoactive component of cannabis, D9-THC (D9-tetrahydrocannabinol) is classified under Schedule I, the strictest classification.

1971, UK introduces a drug classification system and sentencing guidelines, putting Cannabis into class B (a middle class). President Nixon is against the legalization of marijuana even if

¹³ Ibid.

¹⁴ Ibid

¹⁵ Ibid

Shafer Commission (National Commission on Marijuana and Drug Abuse) recommends it and declares war on drugs.

1972, NORML petition to reclassify marijuana under Controlled Substances Act as Schedule 2 to be legally prescribe by physician was refused to be accepted. And Drug Enforcement Agency (DEA) was established.

Under the Controlled Substances Act of 1970 in the USA, marijuana has been classified by U.S. Congress as a Schedule I controlled substance. Prior to the creation of the FDA in 1938, marijuana was a key ingredient in approximately 2,000 prescription medicines in American pharmacies for 100 years, yet it did not receive grandfathering in for FDA approval with other pre-1938 medicines such as aspirin and morphine.

In 1970, at the recommendation of Assistant Secretary Roger Egeberg of the U.S. Department of Health, Education, and Welfare, Congress placed marijuana in Schedule I pending the outcome of government studies then underway. The findings of the studies released in 1972 recommended a reduction in the classification of marijuana, but these recommendations were never applied. Thus, according to the FDA, marijuana is still considered to have no currently accepted medical use and a lack of accepted safety for use under medical supervision.

Netherlands is first to decriminalize marijuana in 1976 under Dutch law, where possession remains a crime. After 1980, a system of coffee shops was introduced with the selling cannabis to adults in small quantities.

In 1986, President Reagan signed the Anti-Drug Abuse Act where possession of 100 marijuana plants received the same penalty as possession of 100 grams of heroin. Anti-Drug Abuse Act established a "three strikes and you're out" policy, requiring life sentences for repeat drug offenders, and providing for the death penalty for "drug kingpins."

In 1990-1992, Scientists discover Cannabinoid Receptors and Endocannabinoid. In 1996, California becomes first state to legalize medical marijuana.¹⁶

¹⁶ Ibid

II. MEDICAL STUDIES

Therapeutic Uses of Cannabinoids

Several studies have demonstrated the therapeutic effects of cannabinoids for nausea and vomiting in the advanced stages of illnesses such as cancer and AIDS. Dronabinol (tetrahydrocannabinol) has been available by prescription for more than a decade in the USA. Other therapeutic uses of cannabinoids are being demonstrated by controlled studies, including treatment of asthma and glaucoma, as an antidepressant, appetite stimulant, anticonvulsant and anti-spasmodic, research in this area should continue. For example, more basic research on the central and peripheral mechanisms of the effects of cannabinoids on gastrointestinal function may improve the ability to alleviate nausea and emesis. More research is needed on the basic neuropharmacology of THC and other cannabinoids so that better therapeutic agents can be found.¹⁷

Glaucoma

Cannabinoids effectively lower the intraocular pressure (IOP) and have neuroprotective actions. Thus, they could potentially be useful in the treatment of glaucoma. In 1971, Hepler and Frank reported a 25–30% IOP lowering effect of smoking marijuana in a small number of subjects. To minimise possible systemic adverse side effects and maximise the dose at the site of action, topical application would be the ideal form of administration. However, natural cannabinoid extracts as well as synthetic forms are highly lipophilic and have low aqueous solubility, creating practical difficulties for this mode of administration.¹⁸

Cannabinoids have the potential of becoming a useful treatment for glaucoma, as they seem to have neuroprotective properties and effectively reduce intraocular pressure. However,

¹⁷HALF BAKED SCIENCE: A PRIMER ON MEDICINAL CANNABIS

¹⁸Tomida, I. (2004). Cannabinoids and glaucoma. *British Journal of Ophthalmology*, 88(5), pp.708-713.

several challenges need to be overcome, including the problems associated with unwanted systemic side effects (psychotropic, reduction in systemic blood pressure), possible tolerance, and the difficulty in formulating a stable and effective topical preparation. Some cannabinoids such as HU-211 and cannabidiol do not have psychotropic effects, while maintaining their IOP lowering action, so that further research on these compounds would be desirable. Tolerance may develop after repeated use of cannabinoids.³⁰ However, tolerance might be beneficial if it develops only or preferentially to unwanted side effects. There has been recent progress in the use of microemulsions and cyclodextrins to overcome the barriers in ocular penetration of topically applied cannabinoids.¹⁹

Epilepsy

The Institute of Medicine wrote in its Mar. 17, 1999 report, "Marijuana and Medicine: Assessing the Science Base":

"Epilepsy is a chronic seizure disorder that affects about 2 million Americans and 30 million people worldwide. It is characterized by recurrent sudden attacks of altered consciousness, convulsions, or other motor activity. A seizure is the synchronized excitation of large groups of brain cells.

There are anecdotal and individual case reports that marijuana controls seizures in epileptics (reviewed in a 1997 British Medical Association report), but there is no solid evidence. While there are no studies indicating that either marijuana or THC worsen seizures, there is no scientific basis to justify such studies."²⁰

Donald Gross, MD, Assistant Professor of Neurology at the University of Alberta, et al., stated in their June 8, 2004 article, "Marijuana Use and Epilepsy; Prevalence in Patients of a Tertiary Care Epilepsy Center," published in *Neurology*:

"Twenty-one percent of subjects had used marijuana in the past year with the majority of active users reporting beneficial effects on seizures. Twenty-four percent of all subjects believed marijuana was an effective therapy for epilepsy.

¹⁹ Ibid.

²⁰ Medicalmarijuana.procon.org, (2015). *Is Marijuana an Effective Treatment for Epilepsy (Seizures)? - Medical Marijuana - ProCon.org.* [online] Available at: <http://medicalmarijuana.procon.org/view.answers.php?questionID=000139> [Accessed 20 May 2015].

Despite limited evidence of efficacy, many patients with epilepsy believe marijuana is an effective therapy for epilepsy and are actively using it."²¹

Presently, Colorado's U.S. senators, Michael Bennet and Cory Gardner, are backing federal legislation to allow children with seizures and adults with intractable epilepsy to have access to medical marijuana. The act would apply to such strains as Charlotte's Web, which was developed for kids and named for Charlotte Figi, an 8-year-old Colorado girl whose seizures from a rare form of epilepsy caused her to stop speaking before her symptoms subsided using the product.²²

Hepatitis C

In May, the WIT team, working closely with a medical marijuana dispensary in Denver and also with a team from GlaxoSmithKline, developed a trial medication based on "Chunky Crimson" which is consumed three times daily, and coupled with a suppository admitted once daily. Human trials showed that 99.8% of recipients of the test drug were fully cured of Hepatitis C, while the remaining 0.2% showed signs of reversal, and could theoretically be cured with continued administering of the rectal suppository alone. Pending FDA approval, WIT hopes to begin human trials on a needle-administered vaccine shot later this year. Meanwhile, the FDA is also reviewing our existing tested drug, which GlaxoSmithKline hopes to begin selling on the market in 2015. Both drugs should hopefully be available globally in 2016. WIT does not endorse the illegal production or sale of marijuana. However, those with legal access to medical or recreational marijuana, in states where marijuana products are deregulated, are encouraged to administer at-home trials using legal marijuana. The marijuana should be smoked, edified, and/ or inserted rectally once per day.²³

²¹ Ibid.

²²The Cannabist, (2015). *New federal bill would allow medical pot use for epilepsy*. [online] Available at: <http://www.thecannabist.co/2015/05/13/federal-medical-marijuana-bill-epilepsy-bennet-gardner/34838/> [Accessed 20 May 2015].

²³Stone, D., DasMeerungeheuer, D., John Brugle, P., Forrester, D., John Brugle, P., MacKenzie, D. and PhD, D. (2014). *Marijuana can cure Hepatitis C, WIT research shows - WIT*. [online] WIT. Available at: <http://witscience.org/marijuana-can-cure-hepatitis-c-wit-research-shows/> [Accessed 20 May 2015].

Diana L. Sylvestre, MD, Assistant Clinical Professor in the Department of Medicine at the University of California, San Francisco, et al. stated in the Oct. 2006 article "Cannabis Use Improves Retention and Virological Outcomes in Patients Treated for Hepatitis C," published in the *European Journal of Gastroenterology & Hepatology*:

*"Our results suggest that modest cannabis use may offer symptomatic and virological benefit to some patients undergoing HCV treatment by helping them maintain adherence to the challenging medication regimen."*²⁴

Amyotrophic Lateral Sclerosis (ALS)

Significant advances have increased our understanding of the molecular mechanisms of amyotrophic lateral sclerosis (ALS), yet this has not translated into any greatly effective therapies. It appears that a number of abnormal physiological processes occur simultaneously in this devastating disease. Ideally, a multidrug regimen, including glutamate antagonists, antioxidants, a centrally acting anti-inflammatory agent, microglial cell modulators (including tumor necrosis factor alpha [TNF-alpha] inhibitors), an antiapoptotic agent, 1 or more neurotrophic growth factors, and a mitochondrial function-enhancing agent would be required to comprehensively address the known pathophysiology of ALS. Remarkably, cannabis appears to have activity in all of those areas. Preclinical data indicate that cannabis has powerful antioxidative, anti-inflammatory, and neuroprotective effects. In the G93A-SOD1 ALS mouse, this has translated to prolonged neuronal cell survival, delayed onset, and slower progression of the disease. Cannabis also has properties applicable to symptom management of ALS, including analgesia, muscle relaxation, bronchodilation, saliva reduction, appetite stimulation, and sleep induction. With respect to the treatment of ALS, from both a disease modifying and symptom management viewpoint, clinical trials with cannabis are the next logical step. Based on the currently available scientific data, it is reasonable to think that cannabis might significantly slow the progression of ALS, potentially extending life expectancy and substantially reducing the overall burden of the disease.²⁵

²⁴Medicalmarijuana.procon.org, (2015). *Is Marijuana an Effective Treatment for the Symptoms of Hepatitis C? - Medical Marijuana - ProCon.org.* [online] Available at: <http://medicalmarijuana.procon.org/view.answers.php?questionID=000217> [Accessed 20 May 2015].

²⁵Carter GT, e. (2015). *Cannabis and amyotrophic lateral sclerosis: hypothetical and practical applications, and a call for clinical trials.* - *PubMed - NCBI*. [online] Ncbi.nlm.nih.gov. Available at: <http://www.ncbi.nlm.nih.gov/pubmed/20439484> [Accessed 20 May 2015].

Crohn's Disease

In a study conducted by the Department of Gastroenterology and Hepatology, Meir Medical Center and Sackler Faculty of Medicine in Tel Aviv University, Kfar Saba, Israel:

“Complete remission (CDAI score, <150) was achieved by 5 of 11 subjects in the cannabis group (45%) and 1 of 10 in the placebo group (10%; P = .43). A clinical response (decrease in CDAI score of >100) was observed in 10 of 11 subjects in the cannabis group (90%; from 330 ± 105 to 152 ± 109) and 4 of 10 in the placebo group (40%; from 373 ± 94 to 306 ± 143; P = .028). Three patients in the cannabis group were weaned from steroid dependency. Subjects receiving cannabis reported improved appetite and sleep, with no significant side effects.” It was then concluded that although the primary end point of the study (induction of remission) was not achieved, a short course (8 weeks) of THC-rich cannabis produced significant clinical, steroid-free benefits to 10 of 11 patients with active Crohn's disease, compared with placebo, without side effects. Further studies, with larger patient groups and a nonsmoking mode of intake, are warranted.²⁶

Timna Naftali, MD, Specialist in Gastroenterology at Meir Hospital and KupatHolim Clinic (Israel), et al., stated the following in their Aug. 2011 Israel Medical Association Journal article titled "Treatment of Crohn's Disease with Cannabis: An Observational Study":

"Of the 30 patients [with Crohn's Disease] 21 improved significantly after treatment with cannabis...The mean number of bowel movements decreased from eight to five a day and the need for other drugs was significantly reduced... the number of patients requiring steroid treatment was reduced from 26 to 4. Fifteen of the patients had 19 surgeries during an average period of 9 years before cannabis use, but only 2 required surgery during an average period of 3 years of cannabis use... The observed beneficial effect in this study may be due to the anti-inflammatory properties of cannabis, but additional effects of cannabinoids may also play a role. Cannabinoids influence gastrointestinal motility and, in particular, have an anti-diarrheal effect..."²⁷

²⁶Medical Daily, (2013). *Medical Marijuana Achieves 'Complete Remission' Of Crohn's Disease; Drug Improves Appetite And Sleep Function, With No Side Effects.* [online] Available at: <http://www.medicaldaily.com/medical-marijuana-achieves-complete-remission-crohns-disease-drug-improves-appetite-and-sleep-247783> [Accessed 20 May 2015].

²⁷Naftali T, e. (2015). *Cannabis induces a clinical response in patients with Crohn's disease: a prospective placebo-controlled study.* - *PubMed - NCBI*. [online] Ncbi.nlm.nih.gov. Available at: <http://www.ncbi.nlm.nih.gov/pubmed/23648372> [Accessed 20 May 2015].

Cachexia

Cachexia, a major complication in most cancer patients, arises from metabolic changes produced by substances created by tumors, as well as cytokines and other endogenous substances. The most significant clinical manifestation is profound anorexia. There is ample evidence that CB1 receptor agonists, such as THC, alter appetite. Indeed, one of the most consistent effects of smoking marijuana is an increase in appetite.²⁸

In a randomized clinical trial, researchers compared the safety and effectiveness of orally administered Cannabis extract (2.5 mg THC and 1 mg cannabidiol), THC (2.5 mg), or placebo for the treatment of cancer-related anorexia-cachexia in 243 patients with advanced cancer who received treatment twice daily for 6 weeks. Results demonstrated that although these agents were well tolerated by these patients, no differences were observed in patient appetite or quality of life among the three groups at this dose level and duration of intervention. Another clinical trial that involved 139 patients with HIV or AIDS and weight loss found that, compared with placebo, oral dronabinol was associated with a statistically significant increase in appetite after 4 to 6 weeks of treatment. Patients receiving dronabinol tended to have weight stabilization, whereas patients receiving placebo continued to lose weight.²⁹

Beal and Flynn examined the effects of THC on appetite and weight in patients with AIDS-related anorexia and reported modest improvement in appetite and mood along with stabilization in weight. A subset of patients actually gained more than 2 kg.

Several early investigations showed that THC increased appetite in cancer patients. More recently, Jatoi et al compared megestrol and THC for palliating cancer-associated anorexia. They found that megestrol provided superior palliation of anorexia among advanced cancer patients. However, the dosing regimen of THC (2.5 mg twice a day) was relatively modest. Combination therapy did not appear to provide additional benefit to megestrol. Nelson et al

²⁸<http://www.gravityfree.com/>, P. (2015). *Cachexia*. [online] Medical Marijuana. Available at: <http://medicalmarijuana.com/medical-marijuana-treatments/Cachexia> [Accessed 20 May 2015].

²⁹National Cancer Institute, (2015). *Cannabis and Cannabinoids*. [online] Available at: <http://www.cancer.gov/about-cancer/treatment/cam/hp/cannabis-pdq#section/all> [Accessed 20 May 2015].

evaluated the effects of THC on appetite in advanced cancer patients suffering from anorexia. Most patients completed the 28-day study and experienced improved appetite.³⁰

Muscular Dystrophy

Scientific studies on cannabis and MD are sorely lacking despite the fact cannabis has been shown effective against common symptoms of MD such as pain and stiffness. There is evidence suggesting it may help related conditions, e.g., amyotrophic lateral sclerosis, which has some similar characteristics, such as impaired movement and muscle loss. An article from a New Jersey newspaper described the experience of young Michael Oliveri. He suffered from tremendous MD-associated pain that numerous medications failed to relieve, so he used medicinal cannabis as a last resort. Dan Pope is a Colorado resident with MD. In a US News article, he stated that cannabis helps control his muscle spasms. It also makes his pain more tolerable. Another man named Patrick McClellan also reported that eating or vaporizing cannabis significantly reduces his muscle spasms and pain.³¹

Severe Fibromyalgia

Fibromyalgia, a chronic pain syndrome, is hard to treat and impossible to cure. With pain so debilitating, patients may wonder about trying medical marijuana to ease their discomfort. Still widely controversial, "medical marijuana" refers to the smoked form of the drug. It does not refer to the synthesized version of THC, one of the active chemicals in marijuana, that's available in a medication called Marinol.

Twenty-eight FM patients who were cannabis users and 28 non-users were included in the study. Demographics and clinical variables were similar in both groups. Cannabis users referred different duration of drug consumption; the route of administration was smoking (54%), oral (46%) and combined (43%). The amount and frequency of cannabis use were also different among patients. After 2 hours of cannabis use, VAS scores showed a statistically significant

³⁰Oncologypractice.com, (2015). [online] Available at: <http://www.oncologypractice.com/jso/journal/articles/0204305.pdf> [Accessed 20 May 2015].

³¹Medicaljane.com, (2015). *Cannabis for Muscular Dystrophy*. [online] Available at: <http://www.medicaljane.com/2015/03/03/cannabis-shows-promise-for-treating-symptoms-of-muscular-dystrophy/> [Accessed 20 May 2015].

($p < 0.001$) reduction of pain and stiffness, enhancement of relaxation, and an increase in somnolence and feeling of well being. The mental health component summary score of the SF-36 was significantly higher ($p < 0.05$) in cannabis users than in non-users. No significant differences were found in the other SF-36 domains, in the FIQ and the PSQI.³²

The use of cannabis was associated with beneficial effects on some FM symptoms. Further studies on the usefulness of cannabinoids in FM patients as well as cannabinoid system involvement in the pathophysiology of this condition are warranted.

Arachnoiditis (pain)

Arachnoiditis is an inflammation of the arachnoid, the protective membrane that covers the brain and spinal cord. Although this condition has no consistent symptom patterns, it commonly affects the nerves connecting the lower back and the legs. Arachnoiditis is characterized by chronic pain, tingling, numbness, muscle spasms and uncontrollable twitching. Additionally, the condition often brings about neurological problems and severe "electric shock" like sensations.³³

Tarlov Cysts (pain)

Tarlov Cysts, also known as perineurial cysts are sacs filled with cerebrospinal-fluid located along the spinal cord. These cysts most commonly affect nerve roots toward the lower end of the spine. The cysts are found incidentally through MRI tests conducted for other purposes. Though some cases of Tarlov Cysts can be asymptomatic, the cysts can expand, putting severe pressure on the affected nerve root. There are four classifications and categories that Tarlov Cysts are placed in, depending on the severity of the experienced symptoms.³⁴

³²Fiz, J., Durán, M., Capellà, D., Carbonell, J. and Farré, M. (2011). Cannabis Use in Patients with Fibromyalgia: Effect on Symptoms Relief and Health-Related Quality of Life. *PLoS ONE*, 6(4), p.e18440.

³³Ninds.nih.gov, (2015). *Arachnoiditis Information Page: National Institute of Neurological Disorders and Stroke (NINDS)*. [online] Available at: <http://www.ninds.nih.gov/disorders/arachnoiditis/arachnoiditis.htm> [Accessed 20 May 2015].

³⁴Marijuanadoctors.com, (2015). *Medical Marijuana and Tarlov Cysts*. [online] Available at: <https://www.marijuanadoctors.com/content/ailments/view/187?ailment=tarlov-cysts> [Accessed 20 May 2015].

Hydromelia and Syringomyelia (pain)

Hydromyelia and syringomyelia refer to similar conditions that involve an abnormal collection of fluid within the spinal cord. As CSF builds up, it puts pressure on the spinal cord and can damage nerve cells and their connections, leading to symptoms.³⁵

In hydromyelia (also known as syringohydromyelia), the cavity that forms is connected to the fourth ventricle (normal fluid space in the brain); and this condition is almost always associated with infants and children who have hydrocephalus or certain other types of brain-related birth defects. Syringomyelia (also known as syrinx), on the other hand, features a cavity that does not communicate with any other fluid spaces, and occurs primarily in adults who have experienced spinal cord trauma.

Symptoms, which may occur over time, include weakness of the hands and arms, stiffness in the legs; and sensory loss in the neck and arms. Some individuals have severe pain in the neck and arms. Diagnosis is made by magnetic resonance imaging (MRI), which reveals abnormalities in the anatomy of the spinal cord.³⁶

Fibrous Dysplasia (pain)

Fibrous dysplasia (FD) is a skeletal disorder in which bone-forming cells fail to mature and produce too much fibrous, or connective, tissue. Areas of healthy bone are replaced with this fibrous tissue. The replacement of normal bone in fibrous dysplasia can lead to pain, misshapen bones, and fracture, especially when it occurs in the long bones (arms and legs). When it occurs in the skull, there can also be a replacement of the normal bone with fibrous tissue, resulting in changes in the shape of the face or skull, pain, and, in rare circumstances, hearing or vision loss. The most common symptoms of the disorder are painful, misshapen, and/or broken bones (fractures). Fractures are more common between the ages of 6 and 10, but often persist into adulthood. The problems a person experiences depend on which bones are affected. For example,

³⁵Ninds.nih.gov, (2015). *Hydromyelia Information Page: National Institute of Neurological Disorders and Stroke (NINDS)*. [online] Available at: <http://www.ninds.nih.gov/disorders/hydromyelia/hydromyelia.htm> [Accessed 20 May 2015].

³⁶Sehati.org, (2015). *Hydromyelia and Syringomyelia*. [online] Available at: <http://sehati.org/index/patientresources/neurologicdisorders/hydromyeliaandsyringomyelia.html> [Accessed 20 May 2015].

the legs can be of different lengths, leading to a limp and the need for a shoe lift. The bones of the sinuses can be affected, leading to chronic sinus congestion. Only very rarely do serious problems such as vision loss or cancer occur.³⁷

Spinocerebellar Ataxia

This condition is a degenerative, progressive, genetic disease which affects both the brain and spinal cord, causing difficulty with coordination. Spinocerebellar Ataxia or SCA comprises the largest group of hereditary, neurodegenerative disorder. Over 60 different types of SCA have been identified as there is no one test to determine the type of SCA present within a patient.³⁸

There is no current medical treatment designed specifically for Spinocerebellar Ataxia, there are several options for patients suffering from the condition. Often if the Ataxia develops as a result of another condition, the underlying condition will first be treated. Because there are so many leading causes of the condition, it is difficult for healthcare professionals to target one specific treatment plan. If, for example, the condition occurs as a result of a metabolic deficiency, a specific diet and medications would be optimal for treatment. If it is caused by a vitamin deficiency, vitamin therapy might be considered. Physical therapy is often utilized for the strengthening of muscles and improved coordination as well. Cannabinoid treatment is recommended for curbing nausea and improving one's appetite. Additionally, cannabinoid treatment can act as an immediate pain reliever. Medical marijuana can help to reduce stresses brought on by the disease, relax tightened muscles, help with associated depression and help patients to achieve full nights of sleep.³⁹

Parkinson's Disease

Parkinson's Disease (PD) is a neurodegenerative disease that is caused by destruction of dopaminergic neurons (i.e. cells of the nervous system that make and release dopamine, a signalling molecule) in the substantia nigra (SN), an area of the brain involved in regulating

³⁷Marijuanadoctors.com, (2015). *Medical Marijuana and Fibrous Dysplasia*. [online] Available at: <https://www.marijuanadoctors.com/content/ailments/view/190?ailment=fibrous-dysplasia> [Accessed 20 May 2015].

³⁸Marijuanadoctors.com, (2015). *Medical Marijuana and Spinocerebellar Ataxia*. [online] Available at: <https://www.marijuanadoctors.com/content/ailments/view/193?ailment=spinocerebellar-ataxia> [Accessed 20 May 2015].

³⁹ Ibid.

movement. Patients with Parkinson's Disease experience tremors, slowed movement, muscle stiffness, balance issues, sleep disturbance, and more. Parkinson's Disease is a debilitating disease with no cure, although there are treatment options available. For patients with PD with difficult-to-control symptoms, or for those who are experiencing severe negative side effects from standard therapy, cannabinoid medicine may provide necessary relief in some instances.⁴⁰

According to a recent study published in *Clinical Neuropharmacology*, participants using smoked medical cannabis had significant improvements in motor disability and impairment. These results were found in addition to reported decreases in tremor (repetitive shaking), rigidity (stiffness or inflexibility), and dyskinesia (difficulty in performing voluntary movements), and improvements in pain and sleep disturbance. This study was flawed in that it included only 22 participants, there was no blinding to treatment (i.e. both the participants and researchers knew that they were using cannabis, which means that the results were potentially a result of "expectancy effects"), and they used a "within-subjects" design, which has well-documented weaknesses. Still, these results show that further study is appropriate and warranted.⁴¹

In a study published in the *Journal of Psychopharmacology* in September 2014 found that treatment with 300 mg/day of the cannabinoid cannabidiol (CBD) in patients with Parkinson's Disease, without dementia or comorbid psychiatric conditions (i.e. those occurring at the same time as the primary disease), increased well-being and quality of life compared to patients who had received the placebo (an inactive treatment used to attempt to control for "expectancy effects"). However, there was no improvement in measures of motor (i.e. movement) and general symptoms, and no evidence for possible neuroprotective effects, and the sample size was small, with only 21 participants split into 3 groups (placebo, 75 mg/day CBD, and 300 mg/day CBD). In spite of the lack of significance in certain measures and the small sample size, these results are impressive, especially given that the increase in well-being and quality of life resulted from use of a non-psychoactive cannabinoid.⁴²

⁴⁰Medicaljane.com, (2014). *Overview of Parkinson's Disease and Medical Marijuana*. [online] Available at: <http://www.medicaljane.com/2014/11/14/parkinsons-disease-and-medical-marijuana/> [Accessed 20 May 2015].

⁴¹Lotan I, e. (2015). *Cannabis (medical marijuana) treatment for motor and non-motor symptoms of Parkinson disease: an open-label observational study*. - *PubMed - NCBI*. [online] Ncbi.nlm.nih.gov. Available at: <http://www.ncbi.nlm.nih.gov/pubmed/24614667> [Accessed 20 May 2015].

⁴² Ibid.

Myoclonus

Myoclonus refers to a quick, involuntary muscle jerk. For example, hiccups are a form of myoclonus. So are the sudden jerks, or "sleep starts," you may experience just before falling asleep. These forms of myoclonus occur in healthy people and rarely present a problem. Most often, myoclonus occurs as a result of a nervous system (neurological) disorder, such as epilepsy, or of a metabolic condition, or as a reaction to a medication.⁴³

There are also some anecdotal evidence on its effectivity regarding the control of this condition.⁴⁴

Dystonia (Movement disorder and Pain)

Dystonia is a neurological movement disorder characterized by abnormal muscle tension and involuntary, painful muscle contractions. It is the third most common movement disorder after Parkinson's disease and tremor, affecting more than 300,000 people in North America.⁴⁵

2002 case study published in the July issue of *The Journal of Pain and Symptom Management* reported improved symptoms of dystonia after smoking cannabis in a 42-year-old chronic pain patient. Investigators reported that subject's subjective pain score fell from 9 to zero (on a zero-to-10 visual analog scale) following cannabis inhalation, and that the subject did not require any additional analgesic medication for the following 48 hours. "No other treatment intervention to date had resulted in such dramatic overall improvement in [the patient's] condition," investigators concluded. A second case study reporting "significant clinical improvement" following cannabis inhalation in a single 25-year-old patient with generalized dystonia due to Wilson's disease was documented by an Argentinian research team in the August 2004 issue of the journal *Movement Disorders*.⁴⁶

⁴³Mayoclinic.org, (2015). *Myoclonus - Mayo Clinic*. [online] Available at: <http://www.mayoclinic.org/diseases-conditions/myoclonus/basics/definition/con-20027364> [Accessed 20 May 2015].

⁴⁴Chalkbeat Colorado, (2015). *'Without marijuana, I'd probably be dead'*. [online] Available at: <http://co.chalkbeat.org/2012/02/22/teen-without-marijuana-id-probably-be-dead/#.VVhtG9qqkqo> [Accessed 20 May 2015].

⁴⁵Norml.org, (2015). *Dystonia*. [online] Available at: <http://norml.org/library/item/dystonia> [Accessed 20 May 2015].

⁴⁶ *Ibid.*

Also in 2004, a German research team at the Hannover Medical School reported successful treatment of musician's dystonia in a 38-year-old professional pianist following administration of 5 mg of THC in a placebo-controlled single-dose trial. Investigators reported "clear improvement of motor control" in the subject's affected hand, and noted, "[Two] hours after THC intake, the patient was able to play technically demanding literature, which had not been possible before treatment." Prior to cannabinoid treatment, the subject had been unresponsive to standard medications and was no longer performing publicly. "The results provide evidence that ... THC intake ... significantly improves [symptoms of] ... focal dystonia," investigators concluded.⁴⁷

CRPS type 1 (RSDS), CRPS type 2 (Causalgia)

Reflex sympathetic dystrophy syndrome (RSDS), also known as complex regional pain syndrome, is a rare disorder of the sympathetic nervous system that is characterized by chronic, severe pain.

Those with CRPS type 1 previously known as RSD may have better luck. CRPS type 1 means no known nerve injury or damage. Type 2 means with known nerve injury and damage. CRPS type 2 was previously known as Causalgia. RSD became a universal term to mean either.⁴⁸

There is also anecdotal evidence on this.⁴⁹

Neurofibromatosis

Neurofibromatosis (otherwise known as NF) is a medical condition that refers to a number of various inherited conditions which are clinically and genetically distinct in nature.

⁴⁷ Ibid.

⁴⁸ WebMD, (2015). *Reflex Sympathetic Dystrophy Syndrome*. [online] Available at: <http://www.webmd.com/brain/reflex-sympathetic-dystrophy-syndrome> [Accessed 20 May 2015].

⁴⁹ Rxmarijuana.com, (2015). *Reflex Sympathetic Dystrophy by Elaine*. [online] Available at: http://rxmarijuana.com/reflex_sympathetic.htm [Accessed 20 May 2015].

Each of these inherited conditions carry a high risk of tumor formation, particularly in the region of the brain.⁵⁰

As a bona fide alternative treatment option, medical marijuana has been proven remedy for patients who seek pain relief time, anti-inflammatory effects and the treatment of Neurofibromatosis. It is already known that marijuana can stimulate the appetite of patients, but researchers have learned that cannabinoids, in addition to having palliative benefits in cancer therapy, have been associated with anti-carcinogenic effects, which are responsible in preventing or delaying the development of cancer or tumor spread. Additionally, medical marijuana has been responsible for slowing tumor growth rates and shrinking them in size.⁵¹

Chronic inflammatory demyelinating polyneuropathy (CIDP)

Chronic inflammatory demyelinating polyneuropathy (CIDP) is a rare neurological disorder in which there is inflammation of nerve roots and peripheral nerves and destruction of the fatty protective covering (myelin sheath) over the nerves. This affects how fast the nerve signals are transmitted and leads to loss of nerve fibers. This causes weakness, paralysis and/or impairment in motor function, especially of the arms and legs (limbs). Sensory disturbance may also be present. The motor and sensory impairments usually affect both sides of the body (symmetrical), and the degree of severity and the course of disease may vary from case to case. Some affected individuals may follow a slow steady pattern of symptoms while others may have symptoms that stabilize and then relapse.⁵²

Sjogren's syndrome

Sjogren's syndrome is a disorder of your immune system identified by its two most common symptoms — dry eyes and a dry mouth.⁵³

⁵⁰Marijuanadoctors.com, (2015). *Medical Marijuana and Neurofibromatosis*. [online] Available at: <https://www.marijuanadoctors.com/content/ailments/view/199?ailment=neurofibromatosis> [Accessed 20 May 2015].

⁵¹ Ibid.

⁵²WebMD, (2015). *Chronic Inflammatory Demyelinating Polyneuropathy*. [online] Available at: <http://www.webmd.com/brain/chronic-inflammatory-demyelinating-polyneuropathy> [Accessed 20 May 2015].

⁵³Mayoclinic.org, (2015). *Sjogren's syndrome Treatments and drugs - Mayo Clinic*. [online] Available at: <http://www.mayoclinic.org/diseases-conditions/sjogrens-syndrome/basics/treatment/con-20020275> [Accessed 20 May 2015].

Sjogren's syndrome often accompanies other immune system disorders, such as rheumatoid arthritis and lupus. In Sjogren's syndrome, the mucous membranes and moisture-secreting glands of your eyes and mouth are usually affected first — resulting in decreased production of tears and saliva. Although you can develop Sjogren's syndrome at any age, most people are older than 40 at the time of diagnosis. The condition is much more common in women. Treatment focuses on relieving symptoms.⁵⁴

Lupus

Lupus is a chronic autoimmune disease in which your body can't tell the difference between viruses, germs and bacteria and your body's own healthy tissue. This leads to your immune system creating antibodies that attack and destroy healthy tissue, leading to inflammation, pain and damage to body parts. Lupus is characterized by flares, where symptoms worsen, and remissions, when symptoms improve. Unlike HIV or AIDS, where the immune system is underactive, the immune system is overactive in lupus.⁵⁵

Symptoms of lupus include pain all over but focused in hands, fingers, wrists, and knees, skin rashes, mouth sores, fatigue, mood changes, swelling of hands and feet, nausea, vomiting, depression, anxiety, seizures, fevers, weight loss, chest pain, hair loss, ulcers, swollen lymph nodes, anemia and abnormal heart rate. Pain and inflammation are two major symptoms of lupus, and cannabis helps relieve both, without nasty side effects that prescription medications have. Cannabis increases the levels of anti-inflammatory protein interleukin-10 and decreases the levels of pro-inflammatory protein interleukin-2. Cannabis has also been shown to suppress the immune system by activating myeloid-derived suppressor cells (MDSCs). MDSCs may help dampen the hyperactive immune system found in lupus. Cannabis also helps treat symptoms of nausea and abdominal cramping that are often severe side effects of commonly prescribed drug for lupus, such as Plaquenil and corticosteroids.⁵⁶

⁵⁴ Ibid.

⁵⁵

ECDF, (2015). *How Cannabis Helps Lupus - ECDF*. [online] Available at: <http://www.theecdf.org/lupus/> [Accessed 20 May 2015].

⁵⁶ Ibid.

Interstitial cystitis

Symptoms of interstitial cystitis, also referred to as painful bladder syndrome (PBS), include a similar discomfort to that caused by urinary tract infections, as well as chronic inflammation of the bladder and an increased sensitivity to pain. Another common symptom is an increase in urination frequency. The average person is said to void liquid waste 7 times every 24 hours, but urination frequency can often reach 60 times per day for sufferers of cystitis.⁵⁷

In conducting the study, the research team, led by Zun-Yi Wang and Dale Bjorling, first used a catheter to induce cystitis with a toxic substance called acrolein. They then treated the mice with GP1a, a selective CB2 agonist, or a placebo at three separate times: 3.5 hours, 22 hours, and 30 hours after acrolein installation. After 48 hours, researchers examined each mouse. According to their results, activation of the CB2 receptors seemed to inhibit inflammation, as swelling and bladder weight were reduced in the group that received cannabinoid treatment. Similarly, acrolein-induced pain sensitivity was inhibited by CB2 activation as well. As expected, cystitis significantly increased urinary frequency in mice. Contrastingly, activation of CB2 receptors seemed to inhibit this effect also. Research suggests a link between the endocannabinoids and bladder functioning in the past, and the research team from University of Wisconsin-Madison believes that their results could open the door for cannabinoid treatments in the case of bladder inflammation. Wang and Bjorling, the corresponding authors, had the following to say in conclusion: “Our data indicate that CB2 receptor is a potential therapeutic target for treatment of painful inflammatory bladder diseases.” Considering that phytocannabinoids like tetrahydrocannabinol (THC) and cannabidiol (CBD) are known to activate the CB2 receptors, one can conclude that medical marijuana could be of benefit in the treatment of chronic bladder diseases. Those who suffer from painful bladder syndrome may be able to find inflammation relief from cannabis-infused beverages, like those made by Venice Cookie Co.⁵⁸

⁵⁷Medicaljane.com, (2013). *Cannabinoids Effective Against Painful Bladder Syndrome*. [online] Available at: <http://www.medicaljane.com/2013/11/06/study-cannabinoids-may-help-treat-painful-bladder-syndrome/> [Accessed 20 May 2015].

⁵⁸ Ibid.

Myasthenia gravis

Myasthenia gravis is an autoimmune and neuromuscular disease that is responsible for fluctuating muscle weakness and overall fatigue. Muscle weakness is caused by the body's many circulating antibodies that block acetylcholine receptors at the postsynaptic neuromuscular junction, inhibiting the excitatory effects of the neurotransmitter acetylcholine on nicotinic receptors at neuromuscular junctions. This particular condition is caused by a breakdown in the normal communication between nerves and muscles. Muscle weakness caused by myasthenia gravis worsens as the affected muscle is used repeatedly. Because symptoms usually improve with rest, your muscle weakness may come and go. However, myasthenia gravis symptoms tend to progress over time, usually reaching their worst within a few years after the onset of the disease.⁵⁹

While there is currently no cure for myasthenia gravis, treatment can help relieve signs and symptoms, such as weakness of arm or leg muscles, double vision, drooping eyelids, and difficulties with speech, chewing, swallowing and breathing. The disease incidence is usually around three to thirty cases per million per year and continues to rise as a result of increased awareness. As an alternative remedy, medicinal cannabis is an exceptional form of medicine for patients who suffer from myasthenia gravis. Marijuana has active ingredients that can lead to decreased feelings of stress and anxiety and even chronic pain. This is a great form for medicine due to the fact that it allows the patient's muscles to relax and function in an appropriate and operational manner.⁶⁰

Hydrocephalus (pain)

The term hydrocephalus is derived from the Greek words "hydro" meaning water and "cephalus" meaning head. As the name implies, it is a condition in which the primary characteristic is excessive accumulation of fluid in the brain. Although hydrocephalus was once known as "water on the brain," the "water" is actually cerebrospinal fluid (CSF) — a clear fluid that surrounds the brain and spinal cord. The excessive accumulation of CSF results in an

⁵⁹Marijuanadoctors.com, (2015). *Medical Marijuana and Myasthenia Gravis*. [online] Available at: <https://www.marijuanadoctors.com/content/ailments/view/204?ailment=myasthenia-gravis> [Accessed 20 May 2015].

⁶⁰ Ibid.

abnormal widening of spaces in the brain called ventricles. This widening creates potentially harmful pressure on the tissues of the brain.⁶¹

Nail-patella Syndrome

Nail-patella syndrome is a rare genetic disorder involving the bones, joints, and connective tissue. Patients may have problems due to limitation of joint mobility, dislocation or both, especially at the elbow and knee where osteoarthritis may eventually occur. Nail-patella patients are also at increased risk for glaucoma and kidney problems. While there is a lack of controlled research on marijuana and nail-patella, one of the three patients who still receive medical marijuana from the federal government – George McMahon – suffers from the condition, and his case is described in the one study of these patients that has been published. This article notes:

“On May 10, 2000, a letter to FDA noted the patient continued to do well on the therapy smoking 8-10 cigarettes per day without other medication. He continued to function well using a cane and occasionally a wheelchair when bothered by spasms and nausea. At present, he utilizes about 7 grams a day or 1/4 ounce of NIDA material that is 3.75% THC ... He indicates that he has been short on his supply 3 times in 10 years, generally for 1-2 weeks, secondary to lack of supply or paperwork problems. When this occurs he suffers more nausea and muscle spasms and is less active as a consequence.”⁶²

Residual Limb Pain

Phantom limb pain is pain that is felt in the area where an arm or leg has been amputated. Although the limb is gone, the nerve endings at the site of the amputation continue to send pain signals to the brain that make the brain think the limb is still there. Phantom limb pain can be mild to agonizing and even disabling for some. And it may lead to a lifelong battle with chronic pain. Women who have had a breast removed because of breast cancer may also feel phantom pain.⁶³

Some people experience other sensations such as tingling, cramping, heat, cold, and squeezing along with pain. You can feel any sensation in the portion of the limb that was

⁶¹<http://www.gravityfree.com/>, P. (2015). *Hydrocephalus*. [online] Medical Marijuana. Available at: <http://medicalmarijuana.com/medical-marijuana-treatments/Hydrocephalus> [Accessed 20 May 2015].

⁶²Mpp.org, (2015). [online] Available at: <http://www.mpp.org/assets/pdfs/library/MedConditionsHandout.pdf> [Accessed 20 May 2015].

⁶³WebMD, (2015). *Phantom Limb Pain and Chronic Pain-Topic Overview*. [online] Available at: <http://www.webmd.com/pain-management/tc/phantom-limb-pain-and-chronic-pain-topic-overview> [Accessed 20 May 2015].

removed (your "phantom" limb) that the limb might have experienced before it was removed. You may also have residual limb pain or "stump pain" at the actual site of the amputation. You may feel cramping, burning, aching, or sensations of heat or cold in the residual limb.⁶⁴

Arnold-Chiari Malformations

Chiari malformations are structural defects in the cerebellum. That's the part of the brain that controls balance.⁶⁵

Alzheimer's Disease

Lisa M. Eubanks, PhD, Staff Scientist at the Scripps Research Institute and the Skaggs Institute for Chemical Biology, et al. stated in an Aug. 9, 2006 article titled "A Molecular Link Between the Active Component of Marijuana and Alzheimer's Disease Pathology," published in *Molecular Pharmaceutics*:

"In contrast to previous studies aimed at utilizing cannabinoids in Alzheimer's disease therapy, our results provide a mechanism whereby the THC molecule can directly impact Alzheimer's disease pathology...It is noteworthy that THC is a considerably more effective inhibitor... than the approved drugs for Alzheimer's disease treatment, donepezil and tacrine, which reduced [protein deposits in the brain] by only 22% and 7%, respectively, at twice the concentration used in our studies...THC and its analogues may provide an improved therapeutic for Alzheimer's disease [by] simultaneously treating both the symptoms and progression of Alzheimer's disease."⁶⁶

Arthritis

Rheumatology reported in a Jan. 2006 article titled "Preliminary Assessment of The Efficacy, Tolerability and Safety of A Cannabis-based Medicine (Sativex) in The Treatment of Pain Caused By Rheumatoid Arthritis," by D.R. Blake et al.:

"In comparison with placebo, the CBM [cannabis-based medicine] produced statistically significant improvements in pain on movement, pain at rest, quality of sleep....

⁶⁴ Ibid.

⁶⁵ Ninds.nih.gov, (2015). *Chiari Malformation Fact Sheet: National Institute of Neurological Disorders and Stroke (NINDS)*. [online] Available at: http://www.ninds.nih.gov/disorders/chiari/detail_chiari.htm [Accessed 20 May 2015].

⁶⁶ Medicalmarijuana.procon.org, (2015). *Can Marijuana Help Treat Alzheimer's Disease? - Medical Marijuana - ProCon.org*. [online] Available at: <http://medicalmarijuana.procon.org/view.answers.php?questionID=000130> [Accessed 20 May 2015].

In the first ever controlled trial of a CBM in RA [rheumatoid arthritis], a significant analgesic effect was observed and disease activity was significantly suppressed following Sativex treatment."⁶⁷

TodMikuriya, MD, a psychiatrist and medical coordinator, stated in the 2002 article titled "Medicinal Uses of Cannabis," published on his website:

"Clinical interviews of over 6500 members at cannabis buyers clubs and patients in my office practice lead to this generalization: Many illnesses or conditions present with both inflammation and muscle spasm. Cannabis is both an antispasmodic and anti inflammatory....Chronic inflammatory conditions like arthritis and lumbosacral disease responds well to cannabis compared with other analgesics."⁶⁸

Multiple Sclerosis

The *Journal of Cannabis Therapeutics* (JCT) reported in a 2001 article by researchers at GW Pharmaceuticals:

"Some patients with multiple sclerosis who smoke cannabis [marijuana] report relief of spasm and pain after the second or third puff of a cannabis cigarette. This implies very rapid transit to, and absorption into the central nervous system. The time involved is seconds rather than minutes."⁶⁹

Britain's House of Lords Select Committee on Science and Technology, published a Nov. 1998 report titled "Cannabis: The Scientific and Medical Evidence," which stated:

"We have received enough anecdotal evidence to convince us that cannabis almost certainly does have genuine medical applications, especially in treating the painful muscular spasms and other symptoms of MS and in the control of other forms of pain... We therefore recommend that the Government should take steps to transfer cannabis and cannabis resin from Schedule 1 of the Misuse of Drugs Regulations to Schedule 2, so as to allow doctors to prescribe an appropriate preparation of cannabis, albeit as an unlicensed medicine and on the named-patient basis, and to allow doctors and pharmacists to supply the drug prescribed."⁷⁰

Tourette's Syndrome

⁶⁷Medicalmarijuana.procon.org, (2015). *Is Marijuana an Effective Treatment for the Symptoms of Arthritis? - Medical Marijuana - ProCon.org.* [online] Available at: <http://medicalmarijuana.procon.org/view.answers.php?questionID=000131> [Accessed 20 May 2015].

⁶⁸ Ibid.

⁶⁹Medicalmarijuana.procon.org, (2015). *Is Marijuana an Effective Treatment for Spasticity Disorders Such as Multiple Sclerosis? - Medical Marijuana - ProCon.org.* [online] Available at: <http://medicalmarijuana.procon.org/view.answers.php?questionID=000215> [Accessed 20 May 2015].

⁷⁰ Ibid.

Kirsten R. Müller-Vahl, MD, Director of the Tourette Syndrome Clinic at the Medical School of Hannover, stated in her Oct. 2003 article "Cannabinoids Reduce Symptoms of Tourette's Syndrome," published in *Expert Opinion on Pharmacology*:

"Currently, the treatment of Tourette's syndrome (TS) is unsatisfactory. Therefore, there is expanding interest in new therapeutical strategies. Anecdotal reports suggested that the use of cannabis might improve not only tics, but also behavioural problems in patients with TS. A single-dose, cross-over study in 12 patients, as well as a 6-week, randomised trial in 24 patients, demonstrated that delta-9-tetrahydrocannabinol (THC), the most psychoactive ingredient of cannabis, reduces tics in TS patients. No serious adverse effects occurred and no impairment on neuropsychological performance was observed. If well-established drugs either fail to improve tics or cause significant adverse effects, in adult patients, therapy with delta-9-THC should be tried. At present, it remains unclear whether herbal cannabis, different natural or synthetic cannabinoid CB1-receptor agonists or agents that interfere with the inactivation of endocannabinoids, may have the best adverse effect profile in TS."⁷¹

⁷¹Medicalmarijuana.procon.org, (2015). *What Is Known about Marijuana's Potential Utility in Treating Tourette Syndrome? - Medical Marijuana - ProCon.org*. [online] Available at: <http://medicalmarijuana.procon.org/view.answers.php?questionID=000221> [Accessed 20 May 2015].

III. HOUSE BILL NO. 4477 AND THE LIST OF QUALIFYING CONDITIONS

HB 4477

On May 26, 2014, House Bill No. 4477 entitled “ An Act Regulating the Use of Cannabis, Establishing for the Purpose the Medical Cannabis Regulatory Authority and Appropriating Funds therefor”, was introduced by Honorable Rodolfo T. Albano III.⁷² This act seeks to regulate the medical use of Cannabis in the Philippines and establish for the purpose the Medical Cannabis Regulatory Authority. In effect, the bill seeks to provide an exemption to the current Dangerous Drugs Act, which classifies Cannabis as a dangerous drug. Hence, the possession, use, delivery, sale and cultivation of the Cannabis is still illegal unless such falls under the exemption provided by the Medical Cannabis bill.⁷³

Similar laws in the U.S.A.

Twenty-three U.S. states and the District of Columbia have enacted laws that remove criminal sanctions for the medical use of marijuana, define eligibility for such use, and allow some means of access — either through dispensaries, home cultivation, or both. In addition, several states have laws that recognize the medical benefits of medical marijuana — or at least certain strains — but that do not actually provide access to medical marijuana due to federal law or policies.⁷⁴

In each of the states, a doctor’s recommendation or certification is required for a patient to qualify. In all of those laws, except California, Massachusetts, and Maryland’s, a physician must certify that the patient has a specific serious medical condition or symptom that is listed in the law. The laws generally include cancer, AIDS, multiple sclerosis, severe or debilitating pain,

⁷²Congress.gov.ph, (2015). [online] Available at: http://www.congress.gov.ph/download/basic_16/HB04477.pdf [Accessed 20 May 2015].

⁷³Pdea.gov.ph, (2015). [online] Available at: <http://pdea.gov.ph/images/Laws/RA9165.pdf> [Accessed 20 May 2015].

⁷⁴Mpp.org, (2015). [online] Available at: <http://www.mpp.org/assets/pdfs/library/MMJLawsSummary.pdf> [Accessed 20 May 2015].

and severe nausea. The laws also protect physicians who make the recommendations and include designated caregivers who may assist one or more patients, such as by picking up their medicine for them from a dispensary. In all of the jurisdictions except Washington state, a patient can obtain a state or county-issued ID card after a state agency receives the patient's application, a fee, and the physician's certification. The cards typically have to be renewed each year, though some states allow them to be renewed every two years. Most of the laws specify that they do not allow marijuana to be smoked in public or possessed in correctional facilities. The laws generally specify that employers do not have to allow on-site marijuana use or employees working while impaired, and several specify that they do not protect conduct that would be considered negligent. Most specify that insurance is not required to cover the costs of medical marijuana.⁷⁵

Fifteen of the laws allow at least some patients to cultivate a modest amount of marijuana at their homes. In one of those states, Arizona, patient cultivation is only allowed if the patient lives at least 25 miles away from a dispensary. Nevada's law only allows certain patients to cultivate, including those living 25 miles or more from a dispensary. In Massachusetts, patient cultivation is allowed only under certain circumstances, such as due to financial hardship. The states that allow home cultivation also allow patients to designate a caregiver to cultivate for them. Seventeen states' and D.C.'s laws allow for state-regulated dispensing, though some of the laws are so new their dispensaries are not yet up and running. The states with state-registered dispensary laws are Arizona, Colorado, Connecticut, Delaware, Illinois, Maine, Maryland, Massachusetts, Minnesota, Nevada, New Hampshire, New Jersey, New Mexico, New York, Oregon, Rhode Island, and Vermont. In addition, California has hundreds of dispensaries, many of which are regulated at the local level, but there is no statewide licensing or regulation of them.

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List of Qualifying Conditions (See Annex A)

The most similar law to HB 4477 in terms of qualifying conditions is from Illinois State, which is in fact the most restrictive and strict medical cannabis law in the States.

⁷⁵ Ibid.

⁷⁶ Ibid.

Dan Riffle, Deputy Director of the Marijuana Policy Project which crafted the legislation, told CBS Chicago, "Unlike California, you're not going to be able to doctor shop. You're not going to be able to walk into an office, pay \$100, and leave five minutes later with a recommendation."⁷⁷

To qualify for an ID card, a patient must have a qualifying medical condition and a statement from an Illinois-licensed MD or DO who is caring for the patient's condition. The physician must certify that the patient "is likely to receive therapeutic or palliative benefit" from medical marijuana. Patients also cannot not be active police officers, firefighters, correctional officers, probation officers, or bus drivers. They cannot have a commercial driver's license or a felony drug conviction. Until July 2014, patients under the age of 18 could not qualify. A new law allows minors to qualify if they suffer from seizures, and it allows the Department of Public Health to adopt rules allowing for minors with other conditions to qualify. Patients may have a single caregiver who may pick up medical marijuana for them. Caregivers must be 21 or older and cannot have a disqualifying drug conviction. They may only assist a single patient.

The qualifying conditions in Illinois are HIV/AIDS; hepatitis C; amyotrophic lateral sclerosis (ALS); Crohn's disease; agitation of Alzheimer's disease; cachexia/wasting syndrome; muscular dystrophy; severe fibromyalgia; spinal cord disease; Tarlov cysts; hydromyelia; syringomyelia; spinal cord injury; traumatic brain injury and postconcussion syndrome; multiple sclerosis; rheumatoid arthritis; Arnold Chiari malformation; Spinocerebellar Ataxia (SCA); Parkinson's disease; Tourette's syndrome; Myoclonus; Dystonia; Reflex Sympathetic Dystrophy (RSD); Causalgia; CRPS; Neurofibromatosis; Chronic Inflammatory Demyelinating Polyneuropathy; Sjogren's syndrome; Lupus; Interstitial Cystitis; Myasthenia Gravis; Hydrocephalus; nail patella syndrome; residual limb pain; seizures; or the treatment of these conditions. The public health department may approve additional conditions.⁷⁸ The qualifying conditions for HB4477 is almost an exact copy of the aforementioned conditions with the exception of Epilepsy and Fibrous Dysplasia.⁷⁹

Illinois' law allows a patient or caregiver with a registry ID card to possess 2.5 ounces of processed marijuana. Patients and caregivers may not grow marijuana. Instead, they will be allowed to obtain medical marijuana from one of up to 60 stateregulated medical marijuana dispensaries, which may be for-profit. Dispensaries will be subject to rules created by the Department of Financial and Professional Regulation. They will obtain medical marijuana from one of up to 22 cultivation centers. Prospective cultivation centers will have to submit detailed

⁷⁷Belville, R. (2013). *Illinois House Passes Nation's Most-Restrictive Medical Marijuana Bill*. [online] The Weed Blog. Available at: <http://www.theweedblog.com/illinois-house-passes-nations-most-restrictive-medical-marijuana-bill/> [Accessed 20 May 2015].

⁷⁸Mpp.org, (2015). [online] Available at: <http://www.mpp.org/assets/pdfs/library/MMJLawsSummary.pdf> [Accessed 20 May 2015].

⁷⁹HB 4477

plans to the Department of Agriculture. All cultivation centers will have 24-hour surveillance that law enforcement can access. They will also be required to have cannabis-tracking systems and perform weekly inventories. Grow centers will be required to abide by department rules, including for labeling, safety, security, and record keeping. Centers will also have to comply with local zoning laws and must be located at least 2,500 feet from daycare centers, schools, and areas zoned for residential use. Fees for both dispensaries and cultivation centers were determined by the regulatory departments. The cultivation fees are the highest in the nation: Applicants will have to pay a non-refundable application fee of \$25,000 and a first-year registration fee of \$200,000.

The law was created with a “sunset” provision, meaning that if the legislature does not renew the program or create a new law, the program will cease to operate on January 1, 2018. Medical marijuana will be subject to a 7% privilege tax and a 1% sales tax.⁸⁰

⁸⁰Mpp.org, (2015). [online] Available at: <http://www.mpp.org/assets/pdfs/library/MMJLawsSummary.pdf> [Accessed 20 May 2015].

IV. SYNTHETIC VS. ORGANIC

Synthetic Cannabinoids

The recently revived interest in the medical uses of cannabis arose at least partly from its popularity as a recreational drug in the 1960s and 70s. Anecdotal reports from young cancer patients who used cannabis reported that it relieved the nausea and vomiting caused by chemotherapy treatments. Modern chemistry also brought about increased interest in the use of at least one of the constituents of cannabis, when Goani and Mechoulam isolated and synthesized D9-THC in 1964. This made the clinical testing of D9-THC during the 1970s and 80s possible, and eventually resulted in the official approval and marketing of the compound as a prescription drug. The chemical synthesis of D9-THC also made possible the synthesis and clinical testing of an entirely new class of pharmaceutical compounds, the synthetic cannabinoids.⁸¹

Dronabinol is another name for the synthetically manufactured (-)-trans-isomer of D9-THC, which is often mentioned in a medical context in scientific literature. Marinol is a trademarked dronabinol preparation dissolved in sesame oil in capsules. It is a registered trademark of Unimed Pharmaceuticals, Inc. It is available in Canada, the USA, and the UK. However, dronabinol has a relatively high incidence of side effects, particularly anxiety and depression.⁸²

Nabilone is a synthetic derivative of D9-THC with a slightly modified molecular structure. With regard to pharmacological activity, 1 mg of nabilone corresponds to about 10 mg of dronabinol. It is a registered trademark of Eli Lilly & Co., and marketed under the name Cesamet. It is on the market in Canada and the UK, and some other European countries.⁸³

Levonantradol is a Pfizer compound that was tested in several clinical trials during the early 1980s. It proved to be considerably more potent than morphine as an analgesic, and was effective in blocking nausea and vomiting in patients undergoing cancer chemotherapy.

⁸¹ *HALF BAKED SCIENCE: A PRIMER ON MEDICINAL CANNABIS*

⁸² *Ibid.*

⁸³ *Ibid.*

Nevertheless, the psychoactive side effects proved to be unacceptable and the company decided to abandon further research on this project.

Other synthetic cannabinoids have been developed with applications relating to research, due to undesirable side effects. Research continues into the development of synthetic cannabinoids that can provide therapeutic benefits while minimizing the medically undesirable psychoactive side effects. Cannabis preparations and synthetic cannabinoids have been employed in the treatment of numerous diseases, with marked differences in the available supporting data. For applications such as nausea and vomiting associated with cancer chemotherapy, anorexia and cachexia in HIV/AIDS, and spasticity in multiple sclerosis and spinal cord injury, there is strong evidence for medical benefits.

For indications such as epilepsy, movement disorders, and depression, much less data is available. However, the history of clinical use of cannabis and cannabinoids has demonstrated that the scientific evidence for a specific indication does not implicitly reflect the actual therapeutic potential for a given disease. Clinical studies with single cannabinoids (like dronabinol), or, less often, with whole plant preparations (smoked cannabis or cannabis extract), have often been inspired by positive anecdotal experiences of patients employing crude cannabis (often illegally). The antiemetic properties, appetite enhancing effects, relaxing effects, and therapeutic use in Tourette's syndrome were all discovered (or rediscovered) this way.⁸⁴

Synthetic vs. Organic (Whole Plant)

Movement and spasticity disorders

In small clinical trials of THC (dronabinol), nabilone, and smoked cannabis, a beneficial effect on spasticity caused by multiple sclerosis or spinal cord injury has been observed. Among other positively influenced symptoms were pain, paraesthesia (tingling skin), tremor, and ataxia (uncoordinated movement). In folk medicine there are also report of improved bowel and bladder control. Some anecdotal evidence for the benefits of marijuana in spasticity due to central lesions

⁸⁴ Ibid.

also exists.⁸⁵

There are some positive anecdotal reports of therapeutic response to cannabis in Tourette's syndrome, dystonia ('frozen' muscles), and tardive dyskinesia (jerky, flailing movement). The use of the drug in treating Tourette's syndrome is currently being investigated in clinical studies. Many patients experience a modest improvement; however, some show a considerable response or even complete symptom control.

Cannabidiol, another natural cannabinoid found in Cannabis, produced a 20 to 50 percent improvement in five patients with dystonia. In Multiple Sclerosis patients, improvements to ataxia and reduction of tremor have been observed following the administration of THC. Despite occasional positive anecdotal reports, no objective success has been found in Parkinson's or Huntington's diseases.

AIDS

In addition to a mountain of anecdotal patient-reported evidence, the appetite-enhancing and nausea-suppressing effects of THC have also been observed in clinical trials. In a long-term study of 94 AIDS patients, the appetite-stimulating effect of THC continued for months. Patients tended to retain a stable body weight over the course of seven months, instead of succumbing to the wasting syndrome associated with AIDS.

However, the slow onset of action of oral THC, and its high cost and high incidence of side effects, result in many patients preferring herbal cannabis. In addition, some people report better symptom control with cannabis rather than dronabinol, which may be related to the additional cannabinoids, such as cannabidiol, that are found in natural cannabis but not in dronabinol.

Unfortunately, the potential respiratory damage resulting from smoke inhalation is at odds with the reduced efficacy of the AIDS' patient immune system. Harm reduction research indicates that heating cannabis to temperatures well below combustion ("vapourization") yields

⁸⁵ Ibid.

active cannabinoids with a significant reduction or elimination of the toxic compounds commonly found in cannabis smoke. More research is required but vapourizers appear to substantially reduce what is widely perceived as the leading health risk of cannabis.⁸⁶

Cancer

Cannabis can act an appetite stimulant, and “generally improves the quality of life” of terminal cancer patients by helping with pain, nausea, vomiting, and loss of appetite associated with chemotherapy. Treatment of pain and of the side effects associated with chemotherapy is the medical indication for cannabinoids that has been most frequently documented. About 40 studies involving THC (dronabinol, nabilone, other THC analogues, smoked cannabis) have been performed. Most trials were conducted in the 1980s. Oral THC has to be given in high and frequent doses, therefore resultant side effects may occur more frequently than with other drugs.⁸⁷

Pain

Few clinical studies of cannabinoids’ effects on pain exist. In two trials, oral THC proved to be effective against cancer pain. However, some patients experienced intolerable side effects. In a single-case double-blind study a patient with recurring pain clearly reduced his need for opiates while receiving THC in comparison to placebo. According to reports from pain therapists, the use of opiates and cannabis concurrently appears to be promising, particularly since cannabis does not cause respiratory depression (as opiates can). Cannabis has been used successfully in modern folk medicine to treat a multitude of painful conditions, such as migraine and other forms of headache, musculoskeletal disorders, arthritis, rheumatism, ulcers, Crohn’s disease, and menstrual pain.⁸⁸

Therapeutic Potential

Cannabis-based medicines have been used for thousands of years in Asia, and were popular for 100 years in Western medicine after their introduction in the mid-nineteenth century. They fell out of use largely because of the difficulties that physicians encountered in obtaining

⁸⁶ *Ibid.*

⁸⁷ *Ibid.*

⁸⁸ *Ibid.*

consistent results from batches of plant material of varying potency. Patients consequently suffered from either treatment with an ineffective dose or the unwanted intoxicating effects of an overdose that could last for many hours. Modern techniques of plant breeding and cultivation have undoubtedly solved the problem of quality control in the use of herbal cannabis as a medicine, but the issue of a narrow therapeutic window between the desired benefits and the usually unwanted psychoactive effects remains a challenge.

Many scientists would argue that modern medicines should be single chemical entities wherever possible, rather than complex mixtures of plant constituents. Proponents of herbal cannabis assert that the plant material has advantages over the pure cannabinoid D9-THC. This argument is often confused, however, by the fact that herbal cannabis is usually smoked whereas THC is taken orally. The oral route for THC is notoriously slow and unreliable, whereas smoking is a very efficient way of delivering the drug quickly and in a manner that allows flexible dose control.

Smoking, however, carries medical risks. In the short term, the irritant effects of cannabis smoke can lead to bronchitis. In the long term, there is the potential for increased risk of cancers of the lung, airways, and mouth. Although the cancer risk cannot be accurately quantified as yet, it may be one of the most serious potential dangers of cannabis. Better methods for delivering both herbal cannabis and pure THC are urgently needed; perhaps vapourization will prove to be an effective and safe mode of administration. Although there have been suggestions that cannabis has adverse long-term effects on pregnancy, the immune system, fertility, and cognition, the available evidence suggests that these are far less severe than originally thought.

The 1990s witnessed major advances in our scientific understanding of how THC and other cannabinoids act on the central nervous system. The discovery that the brain and other organs contain specific protein receptors that recognize the drug and trigger cell responses is analogous to the discovery in the early 1970s of opiate receptors in the brain that bind morphine and other opiates.

As with the opiates, the discovery of specific cannabinoid receptors prompted the search

for putative naturally occurring chemicals that interact with the receptors. This led to the discovery of anandamide as the first of the naturally occurring endogenous cannabinoids. Although anandamide belongs to an entirely different chemical class than THC, it is bound by the same receptors. These discoveries shed entirely new light on the pharmacology of cannabis. Exploration of synthetic anandamide-like chemicals may be one way to obtain improved cannabinoid-based medicines. The pace of discovery has been so rapid in recent years that it would not be unreasonable to anticipate that more members of the cannabinoid receptor family and additional endogenous cannabinoid substances may yet be discovered in the future. This, in turn, could lead to new therapeutic opportunities, perhaps involving a number of natural cannabinoids that do not bind known cannabinoid receptors but nevertheless have some important pharmacological effects.

When cannabis medicines disappeared over half a century ago, this was not perceived in most medical circles as a major restriction of the therapeutic arsenal. However, the situation today is somewhat different. Modern cannabis research and traditional usages along with modern anecdotal reports indicate that cannabis may be the drug of choice for certain patients and conditions. The future will demonstrate whether cannabis in a medicinal context must forever remain a subject for historians.⁸⁹

⁸⁹ Ibid.

V. RECOMMENDATIONS

Regulation

One glaring problem in laws involving the creation of exemptions to illegal narcotics is the vulnerability of the regulating authority to corruption. While the law has good intentions, the likely possibility that the system will be abused for unlawful means and ends cannot be ignored. HB 4477 as it stands currently is lacking in measures to prevent the aforementioned danger.

An example is the dispensation of the Cannabis under Section 14 of the act, which states that the “MCCC shall not release more than the prescribed dosage for 1 month to a registered patient or caregiver.”⁹⁰ This is problematic since the amount of cannabis to be released is solely dependent on the prescription of the Physician, which can hypothetically range from 0 grams to 100 kg or more since there is no clear ceiling amount provided for in the law with regards to dispensation and prescription.

It then recommended that HB 4477 provide for a ceiling amount that can be dispensed. Similar measures were taken in several states in the U.S.A. In Delaware, their law only allows a patient with a registry identification card to possess six ounces at once and to obtain up to three ounces of processed marijuana every 14 days. In New Hampshire, their law only allows a patient with a registry ID card to obtain up to two ounces of processed marijuana every 10 days.⁹¹

Another problem is the seemingly lenient requirements for the licensing of the MCCC, MCSCF, and Physicians. There is also no separate licensing for suppliers, agents, farmers/cultivators, researchers, etc. under the general law. While it is ideal for the government to have separate licensing for each and every level in the chain of custody of the Cannabis, doing so would be impractical and very costly. Furthermore, a very strict approach in regulation would defeat the very purpose of the law to provide inexpensive, accessible Medical Cannabis therapy

⁹⁰ HB 4477

⁹¹ Mpp.org, (2015). [online] Available at: <http://www.mpp.org/assets/pdfs/library/MMJLawsSummary.pdf> [Accessed 20 May 2015].

to patients with debilitating conditions.

As in the U.S., it is therefore recommended that a statutory ceiling on the amount of Cannabis that MCCC's and MCSF's can possess, cultivate, deliver, sell, and dispense at a certain period of time and regulatory fees be imposed. Also, MCCC's and/or MCSF's should be expressly given the exclusive right to possess, cultivate, deliver, sell, and dispense the Medical Cannabis. Furthermore, the law must provide a clearer procedure regarding the chain of custody (i.e. inventory logs, signed and sealed containers, etc.) to ensure that the Cannabis goes into the hands of its intended recipient.

The law actually provides in Section 25 that MCCC's are prohibited from acquiring Cannabis from any other source other than another lawfully registered MCCC; this is probably to ensure that the supply of Cannabis would be easily tracked, monitored, and controlled. However, there is no express provision of the law limiting the amount of Cannabis that each MCCC can possess, cultivate, deliver, sell, and dispense.

In Colorado, the state's medical marijuana center fees range from \$7,500 to \$18,000. The infused products and cultivation fees are each \$1,200. With the exception of new medical marijuana centers and those granted a waiver due to a catastrophic event related to inventory, medical marijuana centers must cultivate at least 70% of the marijuana they dispense, and the rest can only be purchased from other medical marijuana centers. Although there is an exception, a center generally can possess no more than six plants and two ounces per patient who designates it.⁹²

Another good law to borrow from is New Hampshire's law wherein it is provided that caregivers may possess that amount for each patient they assist. Patients and caregivers may not grow marijuana. Instead, they will be allowed to obtain medical marijuana from one of up to four state-regulated alternative treatment centers (ATCs). These ATCs are similar to the MCCCs in HB 4477.⁹³

⁹²Mpp.org, (2015). [online] Available at: <http://www.mpp.org/assets/pdfs/library/MMJLawsSummary.pdf> [Accessed 20 May 2015].

⁹³ Ibid.

“ATCs will be non-profit and may not be located within 1,000 feet of the property of a drug-free zone or school. They must provide patients with educational information on strains and dosage and must collect information patients voluntarily provide on strains’ effectiveness and side effects. Staff must be at least 21, wear ATC-issued badges, and cannot have any felony convictions. The law includes numerous additional requirements, including for periodic inventories, staff training, reporting incidents, prohibiting non-organic pesticides, and requiring recordkeeping. ATCs cannot possess more than either 80 mature plants and 80 ounces total, or three mature plants and six ounces per patient. The health department — with input from an advisory council — will set additional rules, including for electrical safety, security, sanitary requirements, advertising, hours of operations, personnel, liability insurance, and labeling. Rules on security must include standards for lighting, physical security, video security, alarms, measures to prevent loitering, and on-site parking.”

Regarding the chain of custody, Delaware’s approach can be looked upon for guidance. It is provided that “when patients or caregivers are out of their residences, marijuana must be stored in an approved, sealed container obtained from a compassion center, unless the marijuana is being administered or prepared for administration. Registered caregivers may possess up to six ounces for each patient they assist.

Home cultivation is not allowed in Delaware. Patients are allowed to obtain marijuana from state-registered non-profit compassion centers.”⁹⁴

In New Mexico, to be producers (similar to MCCCs) , applicants must submit a great deal of information, including a \$1,000 fee, security plans, the names of persons with authority over the facility’s policies, and a description of packaging that will be used. Each producer’s board members must include at least one physician and at least three registered patients.⁹⁵

It is further provided that “Producers may produce 150 total plants and seedlings and supply marijuana to their patients. Producers cannot be located within 300 feet of schools, churches, or daycare centers. Once a patient registers, the health department provides patients

⁹⁴ Ibid.

⁹⁵ Ibid.

with information on how to contact licensed producers. Annual registration fees range from \$5,000 to \$30,000 for producers and vary based on how long the producers have been operational.”⁹⁶

HB 4477 lacks the aforementioned regulations and safeguards as shown above by States with similar medical marijuana laws. There is no need for separate licensing for suppliers because dispensaries are the ones cultivating. The main feature is there is a limit on how many plants a dispensary can cultivate.

For this other government agencies can be utilized in order to enforce such regulations, such as the PDEA.

Another concern regarding regulation is the seemingly lenient qualifications for the prescribing Physicians. Section 9 provides for four basic qualifications:⁹⁷

- a. Doctor’s Degree in Medicine
- b. Bona fide relationship
- c. License to prescribe drugs
- d. Professional Knowledge of the use of medical cannabis

It can be seen that basically any physician can just prescribe any amount of Cannabis to his patient. In line with the aforementioned suggestions, a statutory ceiling on the amount of recommendations/prescriptions can be imposed in order to prevent undue abuse of the Medical Cannabis system. Also, similar to the Medical Cannabis law of Montana, it is suggested that the prescription of Medical Cannabis must only be done when all other attempts at treatment have been tried and have been unsuccessful plus the second recommendation of another independent physician.

The Montana law provides that: “physicians must describe all other attempts at treatment and that the treatments have been unsuccessful. Physicians also have to state that they have a “reasonable degree of certainty” that each patient would benefit from medical marijuana. A

⁹⁶ Ibid.

⁹⁷ HB4477

provision that is currently enjoined provides that physicians will be investigated at their own expense by the medical board if they make 25 or more recommendations in a 12-month period.

A minor patient only qualifies with parental consent and if the adult controls the dosage, frequency of use, and acquisition of marijuana. They must also have two physicians' recommendations. The health department is responsible for issuing ID cards and may approve additional medical conditions.”⁹⁸

The limitation on the quantity of the Cannabis possessed, cultivated, dispensed, sold, and delivered by the MCCCs and MCSCFs and the quantity of the prescriptions made by a physician plus the other regulations suggested above would be adequate safeguards in implementing the Medical Cannabis System in the Philippines. Hyper stringent regulations would defeat the purpose of the law, which is to provide access to inexpensive alternative therapy through medical cannabis to patients with debilitating medical condition.

Coordination with other Government Agencies

Section 4 of HB 4477 mandates the creation of a Medical Cannabis Authority which is under the DOH and is tasked to be the regulating body of the proposed Medical Cannabis system.⁹⁹ However, there is no mention of the role of the Dangerous Drugs Board (DDB), Philippine Drug Enforcement Agency (PDEA), or other potential agencies with similar jurisdiction over Cannabis, since Cannabis by itself is still illegal in the country under the Dangerous Drugs Act absent an express repeal or amendment in the new law. This overlapping of jurisdiction is a problem of the law.

Section 77 of the Dangerous Drugs Act (RA 9165) provides that:

“Section 77. *The Dangerous Drugs Board.* – The Board shall be the policy-making and strategy-formulating body in the planning and formulation of policies and programs on drug prevention and control. It shall develop and adopt a comprehensive, integrated, unified and balanced national drug abuse prevention and control strategy. It shall be under the Office of the President.”¹⁰⁰

⁹⁸ Mpp.org, (2015). [online] Available at: <http://www.mpp.org/assets/pdfs/library/MMJLawsSummary.pdf> [Accessed 20 May 2015].

⁹⁹ HB4477

¹⁰⁰ RA 9165

This entails that while Cannabis is still classified as a Dangerous Drug, it is still under the jurisdiction of the DDB.

Section 81 of RA 9165 also provide that the DDB has jurisdiction concerning even the lawful use of dangerous drugs, which currently includes cannabis. It is provided that:

Section 81. *Powers and Duties of the Board.* – The Board shall:

(r) Formulate guidelines, in coordination with other government agencies, the importation, distribution, production, manufacture, compounding, prescription, dispensing and sale of, and other lawful acts in connection with any dangerous drug, controlled precursors and essential chemicals and other similar or analogous substances of such kind and in such quantity as it may deem necessary according to the medical and research needs or requirements of the country including diet pills containing ephedrine and other addictive chemicals and determine the quantity and/or quality of dangerous drugs and controlled precursors and essential chemicals to be imported, manufactured and held in stock at any given time by authorized importer, manufacturer or distributor of such drugs;

(v) Establish a regular and continuing consultation with concerned government agencies and medical professional organizations to determine if balance exists in policies, procedures, rules and regulations on dangerous drugs and to provide recommendations on how the lawful use of dangerous drugs can be improved and facilitated.¹⁰¹

PDEA, on the other hand, was created as the implementing arm of the DDB and hence have virtually the same jurisdiction with the DDB. It is provided that:

Section 82. *Creation of the Philippine Drug Enforcement Agency (PDEA).* – To carry out the provisions of this Act, the PDEA, which serves as the implementing arm of the Board, and shall be responsible for the efficient and effective law enforcement of all the provisions on any dangerous drug and/or controlled precursor and essential chemical as provided in this Act.¹⁰²

There are two ways to go about this:

¹⁰¹ Id.

¹⁰² Id.

First, HB 4477 expressly provides that Cannabis be declassified as a Dangerous Drug so it will be outside the jurisdiction of the DDB and PDEA, effectively decriminalizing it. However, civil sanctions such as fines, and maybe even Cannabis taxes can still be provided in Medical Cannabis law.

Second, if Cannabis cannot be declassified as a Dangerous Drug then it is suggested that the Medical Cannabis law include and have the DDB and/or PDEA be involved in the certification of MCCCs, MSCSFs, Physicians, and Patients. This is because the said agencies still have jurisdiction over Cannabis on its own, as it is still a Dangerous Drug.

Budget

Section 28 of HB 4477 already provides a “General Appropriations provision”, which states that the appropriations of the implementation of this act (including the creation of the Authority) would be charged against the current appropriations of the DOH. Then thereafter the continuing implementation of the act would be included in the General Appropriations provision.¹⁰³

However, it is still highly recommended that there be a specific budget for the implementation of the provisions particularly the creation of the Authority, which is a new agency.

Intellectual Property Rights

For synthetic marijuana based patent, the governing law is the Intellectual Property Code and is issued by the Intellectual Property Office of the Philippines.

¹⁰³ HB4477

For natural/ plant marijuana based patents "plant variety protection", the governing law is the Plant Variety Protection Act and is issued by the National Plant Variety Protection Board, which is under the Department of Agriculture.

Even if the political debate on the use of natural Cannabis Sativa continuous, currently there is no actual hindrance for the patenting of synthetic medical marijuana by bona fide medical research centers and laboratories.

In the United States of America, patents on Cannabis Sativa, whether natural or synthetic has always been rejected due to it being immoral and scandalous. Though in 2003, the United States Patent Office started granting protection on Cannabinoids and Cannabidiols, even if use, sale and possession of marijuana is against US federal law.

In the Philippines, Under the Dangerous Drugs Act of 2002, Cannabis Sativa, whether synthetic or natural cannot be used, cultivated or manufactured¹⁰⁴, in any form, kind, class, genus or specie of Cannabis Sativa¹⁰⁵**UNLESS AUTHORIZE BY LAW.** But such law **DOES NOT PROHIBIT** the making and research of MEDICAL MARIJUANA for medical purposes.¹⁰⁶ Therefore the public order or morality clause prohibition in the Patent law cannot be used to reject patents on medical marijuana, by medical laboratories or medical research centers. Though the IRR and certification of the Dangerous Drugs Board must be followed in order to conduct research for medical marijuana, including making of new medicines. Thus following the intent of the law, it would seem that the sale, use and manufacture of synthetic medical marijuana is

¹⁰⁴Manufacture. – The **production, preparation, compounding or processing of any dangerous drug** and/or controlled precursor and essential chemical, either **directly or indirectly or by extraction from substances of natural origin, or independently by means of chemical synthesis or by a combination of extraction and chemical synthesis**, and shall include any packaging or repackaging of such substances, design or configuration of its form, or labeling or relabeling of its container; **except that such terms do not include the preparation, compounding, packaging or labeling of a drug or other substances by a duly authorized practitioner as an incident to his/her administration or dispensation of such drug or substance in the course of his/her professional practice including research, teaching and chemical analysis of dangerous drug or such substances that are not intended for sale or for any other purpose.** " **Definition Under Dangerous Drugs Act of 2002**"

¹⁰⁵ Cannabis or commonly known as "Marijuana" or "Indian Hemp" or by its any other name. – Embraces every kind, class, genus, or specie of the plant Cannabis sativa L. including, but not limited to, Cannabis americana, hashish, bhang, guaza, churrus and ganjab, and embraces every kind, class and character of marijuana, whether dried or fresh and flowering, flowering or fruiting tops, or any part or portion of the plant and seed.

¹⁰⁶Section 16. Cultivation or Culture of Plants Classified as Dangerous Drugs or are Sources Thereof. - The penalty of life imprisonment to death and a fine ranging from Five hundred thousand pesos (P500,000.00) to Ten million pesos (P10,000,000.00) shall be imposed upon any person, who shall plant, cultivate or culture marijuana, opium poppy or any other plant regardless of quantity, which is or may hereafter be classified as a dangerous drug or as a source from which any dangerous drug may be manufactured or derived: **Provided, That in the case of medical laboratories and medical research centers which cultivate or culture marijuana, opium poppy and other plants, or materials of such dangerous drugs for medical experiments and research purposes, or for the creation of new types of medicine, the Board shall prescribe the necessary implementing guidelines for the proper cultivation, culture, handling, experimentation and disposal of such plants and materials.**

currently allowed by law, and would be regarded most likely as the same as any controlled drug that may be dispensed by medical professionals.

But for natural marijuana the prohibition is unclear as the Dangerous Drugs act or its implementing rules does not outright prohibit the patenting of natural medical marijuana. The Plant Variety Act does not also indicate that natural medical marijuana plants may not be granted protection as the law does not have a similar prohibition on plants that are against public order and morality. Though the current restrictions on the Dangerous Drug Act would most likely curtail any sale, use, cultivation or manufacture of natural marijuana even if granted protection under the Plant Variety Protection Act.

Exception to rights of a pantentee

Sec. 72.5 of the amended intellectual property code : Where the act consists of the preparation for individual cases, in a pharmacy or by a medical professional, of a medicine in accordance with a medical shall apply after a drug or medicine has been introduced in the Philippines or anywhere else in the world by the patent owner, or by any party authorized to use the invention: Provided, further, That the right to import the drugs and medicines contemplated in this section shall be available to any government agency or any private third party

Compulsory Licensing

Under compulsory licensing of drug and medicines, a drug company may be compelled to license out its patent when the demand for the patented drugs and medicines in the Philippines is not being met to an adequate extent and on reasonable terms, as determined by the Secretary of the Department of Health. The term reasonable terms, includes the price of the drug, quantity, quality, and so forth. But under this system the drug companies would not be compelled to make the drug, it would only be compelled to allow third parties to manufacture and distribute the

patented drug. Under the law, it would only be required that the licensee pay the patentee reasonable royalty fees as determined by the IPOPHL.

SEC. 93. Grounds for Compulsory Licensing. - The Director General of the Intellectual Property Office may grant a license to exploit a patented invention, even without the agreement of the patent owner, in favor of any person who has shown his capability to exploit the invention, under any of the following circumstances:

93.1. National emergency or other circumstances of extreme urgency;

93.2. Where the public interest, in particular, national security, nutrition, health or the development of other vital sectors of the national economy as determined by the appropriate agency of the Government, so requires; or

93.3. Where a judicial or administrative body has determined that the manner of exploitation by the owner of the patent or his licensee is anti-competitive; or

93.4. In case of public non-commercial use of the patent by the patentee, without satisfactory reason;

93.5. If the patented invention is not being worked in the Philippines on a commercial scale, although capable of being worked, without satisfactory reason: Provided, That the importation of the patented article shall constitute working or using the patent; (Secs. 34, 34-A, 34-B, R.A. No. 165a) and

93.6. Where the demand for patented drugs and medicines is not being met to an adequate extent and on reasonable terms, as determined by the Secretary of the Department of Health.