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Half-Baked: The Science and Politics of Legal Pot

Joelle Anne Moreno

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Half-Baked: The Science and Politics of Legal Pot

Joëlle Anne Moreno*

ABSTRACT

Weed, herb, grass, bud, ganja, Mary Jane, hash oil, sinsemilla, budder, and shatter. Marijuana – whether viewed as a medicine or intoxicant – is fast becoming a part of everyday life, with the CDC reporting 7,000 new users every day and the American market projected to grow to \$20 billion by 2020. Based on early campaign rhetoric, by that same year the U.S. could have a pro-marijuana president.

Despite its growing acceptance and popularity, marijuana remains illegal under federal law. Like heroin, LSD, and ecstasy, marijuana is a DEA Schedule I drug reflecting a Congressional determination that marijuana is both overly addictive and medically useless.

So what is the truth about pot? The current massive pro-marijuana momentum and increased use, obscures the fact that we still know almost nothing about marijuana's treatment and palliative potential. Marijuana's main psychoactive chemical is THC; but it also contains over 500 other chemicals with unknown physiological and psychological effects that vary based on dosage and consumption method. Medical marijuana may be legal in 32 states and supported by 84% of Americans, but federal constraints shield marijuana from basic scientific inquiry. This means that lawmakers and voters are enthusiastically supporting greater access to a drug without demanding critical scientific data. For policymaking purposes, this data should include marijuana's short and long-term brain

*Joëlle Anne Moreno, Professor of Law & Associate Dean for Faculty, Florida International University College of Law, Miami, FL. My son Adam suggested I simply dedicate this Article "to funions." That would have been hilarious, but misleading. Kurt Vonnegut was probably right that "alcohol and marijuana used in moderation, plus loud usually low-class music, makes stress and boredom infinitely more bearable;" but I personally rely on Cabernet and not cannabis. Many law professors use this space to advertise their (one can only suspect imaginary) personal mentorship by a bevy of famous jurists and academics, which would have been fun to include given the topic. Instead I just want to thank my team – Adam, his brother Nathan, and their father Ken. Work can be interesting and useful - but you are my life.

effects, possible lung and cardiac implications, chemical interactions with alcohol and other drugs, addiction risks, pregnancy and breast-feeding concerns, and the effects of secondhand smoke.

This Article treats marijuana as a significant contemporary science and law problem. It focuses on the fundamental question of regulating a substance that has not been adequately researched. The Article examines the extant scientific data, deficiencies, and inconsistencies and explains why legislators should not rely on copycat laws governing alcohol or prescription narcotics. It also explores how marijuana's hybrid federal (illegality)/state (legality) raises compelling theoretical and practical Constitutional questions of preemption, the anti-commandeering rule, and congressional spending power. Marijuana legalization has, thus far, been treated as a niche academic concern. This approach is short-sighted and narrowminded. Marijuana regulation implicates the reach of national drug policy, the depth of state sovereignty, and the shared obligation to ensure the health and safety of our citizenry.

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I. INTRODUCTION

In the movie *This is the End* (2013), a group of stoner actors gather at James Franco’s house unaware of the impending Apocalypse which, like all cinematic disasters, will force each of them to reconsider their life choices and priorities.

Jay Baruchel: Can we please go to f***ing Carl’s Jr.?

Seth Rogen: Uh, I would love to, but I’m on a . . . I can’t really eat that stuff right now. I’m on a . . . I’m on this cleanse . . .

Jay Baruchel: So you’re not drinking, you’re not smoking weed?

Seth Rogen: Oh, no. I’m drinking, I’m smoking weed. I’m on a cleanse, I’m not psychotic.¹

In an art imitates life cinematic moment, Seth Rogen speaks for America. Marijuana is fast becoming an essential element of everyday life.

1. THIS IS THE END (Columbia Pictures Corp. 2013); see also *This Is the End – Quotes*, IMDB, <https://imdb.to/2RjwQL3> (last visited Mar. 18, 2019).

As the New York Times similarly and rather humorously reported on June 21, 2018, “decriminalizing marijuana has left pot smoke the signature olfactory experience of New York”² The shift from the urban summertime stink of rotting garbage to the urbane odor of cultivated pot is only partly welcome. Wonder Woman, a currently trendy cannabis strain, has been described as a powerful “mostly skunky smell with notes of fruit and jet fuel.”³ But in New York City and elsewhere, marijuana is now an everyday experience, even for those who follow the late First Lady Nancy Reagan’s signature advice—“*just say no.*”⁴

A. *Introduction to Legal Pot*

Marijuana legalization advocacy is at an all-time high.⁵ The current public debate began in the late 1990s. Over the past three decades, pro-legalization forces have persuasively argued that the advantages of medical marijuana (e.g., potential therapeutic applications, avoiding the prosecution of otherwise law-abiding medical users, and preventing the disparate prosecution of minorities for low level crimes) outweigh the disadvantages (e.g., addiction possibility, increased roads and highway safety concerns, accidental ingestion, and potential short or long-term psychological and/or physiological risks).

Despite widespread state legalization, marijuana’s medical potential remains uncharted, while the enforcement of marijuana laws where pot remains illegal is a massive, problematic, and costly undertaking. This is especially concerning because “[o]f the 8.2 million marijuana arrests

2. Ginia Bellafante, *Marijuana: The Signature Olfactory Experience of New York*, N.Y. TIMES (June 21, 2018), <https://nyti.ms/2zr0ua0>.

3. *Id.*

4. See Michael McGrath, *Nancy Reagan and the negative impact of the ‘Just Say No’ anti-drug campaign*, THE GUARDIAN (Mar. 8, 2016, 2:23 PM), <https://bit.ly/2qu6Dvy> (arguing that the mid-80s “Just Say No” campaign was ineffective because it “aligned ‘drugs’ (non-specific in terms of type and method of ingestion) with a dangerous and roughly defined ‘other’, and presented them as the consequence of collective personal failure in affected communities rather than a public health crisis for millions of Americans”); see also Scott O. Lilienfeld & Hal Arkowitz, *Why “Just Say No” Doesn’t Work*, SCI. AM. MIND (Jan. 1, 2014), <https://bit.ly/2gt9kNB> (citing to the extensive data “reveal[ing] that teens enrolled in the [D.A.R.E.] program [Drug Abuse Resistance Education—a cornerstone of the “Just Say No” Prevention Program] were just as likely to use drugs as were those who received no intervention,” while additional data demonstrates that some D.A.R.E. programs paradoxically “backfire when it comes to the use of milder substances, such as alcohol and cigarettes . . . [and there is even] a slight tendency for teens who went through D.A.R.E. to be more likely to drink and smoke than adolescents not exposed to the program” because “D.A.R.E. may inadvertently convey the impression that alcohol and tobacco are innocuous by comparison”).

5. See *Marijuana Legalization and Regulation*, DRUG POL’Y ALLIANCE, <https://bit.ly/2xfjncZ> (last visited Mar. 18, 2019).

between 2001 and 2010, 88% were for simply having marijuana.⁶ The American Civil Liberties Union (ACLU) reports cannabis law enforcement costs state governments a total of \$3.6 billion annually.⁷ Given the high cost of arresting for low-level criminality, legal marijuana creates an irresistible win-win. Legalization offers state and local government a path to reduce law enforcement costs while simultaneously increasing revenue by creating new licensing, regulatory, and taxation income streams.

Today, there may be a dispensary down the block from where you live—but make no mistake, pot is illegal. Since 1970, Congress has banned marijuana as a Schedule I drug under the Controlled Substances Act (CSA).⁸ Schedule I drugs are illegal by definition even in the absence of valid scientific substantiation. Marijuana’s Schedule I status is based solely on a five-decade-old congressional finding that pot, like heroin, LSD, and methylenedioxymethamphetamine (a.k.a. MDMA or ecstasy), has a high potential for abuse and has no currently accepted medical use in treatment.⁹ With marijuana now legal in most states, very little attention has been paid to its Schedule I status and its implications for scientific research.

Despite its enduring federal illegality, today pot can be legally grown, used, bought, and sold in a growing number of states across the country. It is possible, but far from certain, that the current massive shift to greater

6. *Marijuana Arrests by the Numbers*, AM. CIVIL LIBERTIES UNION <https://www.aclu.org/gallery/marijuana-arrests-numbers> (last visited Mar. 18, 2019).

7. HUMAN RIGHTS WATCH & AM. CIVIL LIBERTIES UNION, *EVERY 25 SECONDS: THE HUMAN TOLL OF CRIMINALIZING DRUG USE IN THE UNITED STATES* 5, 185-86 (2016) (highlighting how U.S. drug policies affect human lives, including those charged with criminal drug offenses relating to the possession and use of marijuana).

8. Controlled Substances Act, 21 U.S.C. §§ 801–971 (2012 & Supp. 2017). The CSA provides that, “[e]xcept as authorized by this subchapter, it shall be unlawful for any person knowingly or intentionally— to manufacture, distribute, or dispense, or possess with intent to manufacture, distribute, or dispense, a controlled substance.” 21 U.S.C. § 841(a)(1). The CSA classifies controlled substances into five schedules and marijuana is classified as a Schedule I drug, which is the most restrictive category reserved for substances deemed to have high abuse potential and no currently accepted medical purpose, except for government-approved research projects. *See* 21 U.S.C. § 812(a)–(c); *see also* 21 U.S.C. § 823(f). Under the CSA, the Attorney General and Secretary of Health and Human Services can add or remove “any drug or other substance” from the schedules. *See* 21 U.S.C. § 811(a)–(b).

9. 21 C.F.R. § 1308.11(b)–(d) (2018) (providing a list of current Schedule I drugs, such as heroin, lysergic acid diethylamide (LSD), mescaline, and other hallucinogenic amphetamine derivatives); *see also* 21 U.S.C. § 812(b)(1) (2018) (emphasizing that Schedule I drugs have a “high potential for abuse . . . no currently accepted medical use in treatment in the United States . . . [and] a lack of accepted safety for use . . . under medical supervision”); 21 U.S.C. § 801(2) (declaring the congressional finding—as of the modern CSA’s enactment in 1970—that controlled substances like marijuana “have a substantial and detrimental effect on the health and general welfare of the American people.”).

legal marijuana use could eventually provide an increased evidence base of its effects provoking the federal government to remove current research obstacles. In the interim, the simultaneous legality and illegality of cannabis is unusual and intriguing. Local decriminalization clearly reflects intrastate interests, but as marijuana momentum increases, political, legal, and regulatory complexities transcend state line. At the same time, shifts in federal policy and enforcement protocols (most recently and notably between the Obama and Trump administrations) exacerbate preexisting federal-state tensions.¹⁰ As the recent heated debate about medical marijuana access for veterans demonstrates,¹¹ the current delicate balance between federal and state law and policy cannot endure. A well-publicized February 2018 lawsuit seeking to resolve this problem through federal legalization of marijuana was dismissed;¹² but future legal tensions and challenges are inevitable.

In the U.S., legal pot was initially only available for medical purposes. In November 1996, California became the first state to legalize medicinal pot when voters passed Proposition 215.¹³ Proposition 215 became California's Compassionate Use Act, permitting patients (and their primary caregivers) to possess and cultivate marijuana—with a physician's recommendation—for the treatment of various enumerated disorders.¹⁴ The California law also protects physicians from legal sanction if they recommend cannabis to their patients.¹⁵ State medical marijuana statutes enacted after California's typically adopt a similar structure by insulating qualified patients and their doctors from arrest, prosecution, and civil sanction (e.g., fines or forfeiture).¹⁶ Many state laws also specifically permit designated caregivers to lawfully “possess, handle,

10. See *infra* notes 346–55 and accompanying text.

11. See Julio Ochoa, *Veterans Lobby Federal Government for Medical Marijuana Access*, WBUR (Sept. 19, 2018), <https://wbur.fm/2PL8byq> (highlighting that veterans around the country are calling on the federal government to reclassify marijuana to reflect its medical value because they say that they use the drug to treat conditions from pain to post-traumatic stress disorder).

12. *Washington v. Sessions*, No. 17 Civ. 5625 (AKH), 2018 WL 1114758, at *3–10 (S.D.N.Y. Feb. 26, 2018); see also Brendan Pierson, *U.S. federal judge rejects challenge to marijuana prohibition*, REUTERS (Feb. 26, 2018, 7:35 PM), <https://reut.rs/2ACDF1x> (explaining that the U.S. District Court “ruled that the lawsuit must be dismissed because the plaintiffs had failed to use administrative procedures within the Drug Enforcement Administration (DEA) to challenge the ban,” but the decision “should not be understood as a factual finding that marijuana lacks any medical use in the United States”).

13. Compassionate Use Act of 1996, CAL. HEALTH & SAFETY CODE § 11362.5 (West 2018) (originally enacted by California Proposition 215).

14. *Id.*

15. *Id.* § 11362.5(c).

16. Robert A. Mikos, *On the Limits of Supremacy: Medical Marijuana and the States' Overlooked Power to Legalize Federal Crime*, 62 VAND. L. REV. 1421, 1430 (2009) (discussing N.M. STAT. ANN. § 26-2B-4(A) (West 2018)).

and even cultivate marijuana on behalf of qualified patients without fear of state-imposed sanctions.”¹⁷ The first wave of medicinal cannabis legalization (1996-2004) included Alaska, California, Colorado, Hawaii, Maine, Montana, Nevada, Oregon, Vermont, and Washington.¹⁸

In 2001, the Supreme Court entered the medicinal cannabis debate. As discussed in more detail below, in *United States v. Oakland Cannabis Buyers' Cooperative*,¹⁹ the Court rejected an argument that the California law had effectively created a new medicinal necessity exception to the CSA.²⁰ Four years later, in *Gonzales v. Raich*,²¹ the Court would specifically uphold federal CSA marijuana enforcement as a proper exercise of Congressional Commerce Clause power.²² But Supreme Court intervention has done nothing to ameliorate federalism tensions or slow the tide of legalization. In the immediate wake of *Raich*, 32 additional states legalized medical marijuana, bringing the current total to 32 states plus the District of Columbia, Guam, and Puerto Rico.²³ In 2014, poised to reenter the marijuana legalization debate, the Court sidestepped a case involving recreational use legalization.²⁴ Nebraska and Oklahoma had sought to enjoin Colorado from implementing its recreational use statute, arguing that the new law “created a dangerous gap in the federal drug control system,” and that interstate commerce was implicated because “[m]arijuana flows from this gap into neighboring states.”²⁵ The Court declined to even hear the case, although Justice Thomas and Justice Alito dissented from this decision.²⁶

Legal pot is increasingly popular among voters. By 2018, legalization for medical use was supported by 84% of Americans.²⁷ That same year, the FDA enhanced medical pot’s mainstream appeal by approving the first

17. *Id.* at 1431.

18. *Id.* at 1423 n.6; *see also* DRUG POL’Y ALLIANCE, *supra* note 5.

19. *United States v. Oakland Cannabis Buyers' Coop.*, 532 U.S. 483 (2001).

20. *Id.* at 494–96.

21. *Gonzales v. Raich*, 545 U.S. 1 (2005).

22. *Id.* at 19–22.

23. *See* German Lopez, *Marijuana is Legal for Medical Purposes in 32 States*, VOX, <http://bit.ly/2RCaLYi> (last updated Nov. 14, 2018) (showing the 32 states that have legalized medical marijuana: Alaska, Arizona, Arkansas, California, Colorado, Connecticut, Delaware, Florida, Hawaii, Illinois, Maine, Maryland, Massachusetts, Michigan, Minnesota, Missouri, Montana, New Hampshire, Nevada, New Jersey, New Mexico, New York, North Dakota, Ohio, Oregon, Oklahoma, Pennsylvania, Rhode Island, Utah, Vermont, Washington, and West Virginia).

24. *See generally* *Nebraska v. Colorado*, 136 S. Ct. 1034 (2016) (No. 144, Orig.).

25. Petition for Writ of Certiorari at 3, *Nebraska v. Colorado*, 135 S. Ct. 2070 (Dec. 18, 2014) (No. 144, Orig.).

26. *See Nebraska*, 136 S. Ct. at 1034 (Thomas, J., dissenting).

27. Kevin Loria, *23 health benefits of marijuana*, BUSINESS INSIDER (Mar. 7, 2018, 10:57 AM), <https://read.bi/2wjbViN>.

cannabis-derived medication.²⁸ Legalization momentum increasingly includes support for recreational-use legalization or decriminalization. Over the past six years, each of the first nine states to legalize medicinal marijuana (except Hawaii) has legalized the possession of small amounts of recreational-use cannabis. Massachusetts and the District of Columbia have also similarly decriminalized limited recreational use.

Public support for both medical and recreational cannabis has also started to cross party lines. The overall political popularity of cannabis legalization is now “at the highest point in nearly five decades.”²⁹ Over the past decade, legal pot support has doubled. A 2017 Gallup poll revealed that 51% of Republicans now support marijuana legalization.³⁰ This represents a dramatic increase from the 42% of Republicans who expressed support in 2016.³¹ Although increasingly bipartisan, voter support for legal pot remains stronger among Democrats (72%) and independents (67%).³² In these fractious times, it is tempting to view bipartisan support for marijuana legalization as a common shift in social values or personal liberty. But these assumptions naïvely underestimate the importance of marijuana money.

B. *Introduction to Marijuana Markets*

The national market for legal marijuana is exceptionally strong and expanding. Indeed, “the total estimated value of legal cannabis sales in the United States was \$5.7 billion in 2015 and \$7.1 billion in 2016.”³³ As trips to the local dispensary replace trips to the local bar, states that have legalized both medical and recreational marijuana are capitalizing on new business, license, taxation, and other revenue opportunities.³⁴ For example, Colorado reported 2015 cannabis sales and tax revenue of \$88,239,323.³⁵ Similarly, during the 2016 fiscal year, Washington state reported “local sales taxes and state business and occupation taxes on recreational and medical cannabis” totaling \$53,410,661.³⁶

28. Ryan Grenoble, *First Cannabis-Derived Drug Approved by FDA for Medical Use*, HUFFINGTON POST (last updated June 29, 2018), <https://bit.ly/2lw37tZ>.

29. Justin McCarthy, *Record-High Support for Legalizing Marijuana Use in U.S.*, GALLUP (Oct. 25, 2017), <https://bit.ly/2QdoXXB>.

30. *Id.*

31. *Id.*

32. *Id.*

33. NAT’L ACADS. OF SCIS., ENG’G, & MED., *THE HEALTH EFFECTS OF CANNABIS AND CANNABINOIDS* 377–378 (2017) [hereinafter *THE HEALTH EFFECTS OF CANNABIS*].

34. See Jeremy Berke & Skye Gould, *Michigan became the 10th state to legalize recreational marijuana. This map shows every US state where the drug is legal*, BUSINESS INSIDER (Nov. 7, 2018, 10:35 AM), <https://read.bi/2E6hSmt>.

35. *THE HEALTH EFFECTS OF CANNABIS*, *supra* note 33, at 378.

36. *Id.*

The future of new marijuana markets is even brighter. A recent report issued by BDS Analytics, a cannabis “business intelligence” research firm, estimates that California (with its population of 40 million people) should expect annual sales to hit \$3.7 billion in 2018 and increase to \$5.1 billion by 2019.³⁷ Other cannabis industry analysts have been (unsurprisingly) equally bullish, estimating annual national marijuana sales revenue for 2017—before California legalized recreational pot—as high as \$10 billion.³⁸ On July 19, 2018, the business of marijuana first went mainstream when Tilray (a Canadian medical marijuana company) became the first marijuana company to go public on a major U.S. exchange (Nasdaq).³⁹ In December 2018, Altria (the parent company of Philip Morris) announced a \$2.4 billion investment in Cronos Group (a medical and recreational marijuana company based in Canada).⁴⁰

Marijuana market increases reflects a rapidly growing consumer base. Marijuana is now the most-used illicit drug and national consumption rates for all cannabis products are rising rapidly. In 2017, more than 11 million adults in the U.S. ages 18-25 smoked, vaped, or ate marijuana.⁴¹ Over the past decade, annual U.S. cannabis use has increased from 10.88% among Americans age twelve and older (2008–2009) to 13.71% (2015–2016).⁴² In contrast, over the same seven-year period, annual cocaine use decreased from 2.01% to 1.84%, tobacco use declined from 28.06% to 23.72%, and alcohol use remained virtually constant, shifting just slightly from 51.74% to 51.21%.⁴³ In 2016, the Centers for Disease Control and Prevention (“CDC”) reported that 2.5 million Americans annually start using marijuana, a daily average of

37. Jeremy Berke, *California’s cannabis market is expected to soar to \$5.1 billion — and it’s going to be bigger than beer*, BUSINESS INSIDER (Feb. 28, 2018, 11:30 AM), <https://read.bi/2DPBnio>.

38. Jeremy Berke, *The legal marijuana market is exploding — it’ll hit almost \$10 billion sales in this year*, BUSINESS INSIDER (Dec. 8, 2017, 3:46 PM), <https://read.bi/2F35BDy>.

39. Chloe Aiello & Kellie Ell, *Tilray joins Nasdaq in first US cannabis IPO*, CNBC (July 23, 2018, 2:28 PM), <https://cnb.cx/2JEeh0i>; see also Gene Johnson, *Canadian marijuana company has first US marijuana IPO*, MERCURY NEWS (July 20, 2018, 12:01 PM), <https://bayareane.ws/2LHlyy2> (“Tilray isn’t the first pot company to trade on a major American stock exchange, but it is the first to do so with an IPO, a step that could boost credibility and confidence in the industry . . .”).

40. *Marlboro maker Altria buys big stake in Canadian marijuana company*, CBS NEWS (Dec. 7, 2018, 9:55 AM), <https://www.cbsnews.com/news/altria-marlboro-maker-buys-big-stake-in-cronos-canadian-marijuana-company/>.

41. *DrugFacts: What is marijuana?*, NAT’L INST. ON DRUG ABUSE, <https://bit.ly/1QbDwb4> (last updated June 2018).

42. *National Survey on Drug Use and Health: Comparison of 2008–2009 and 2015–2016 Population Percentages*, SUBSTANCE ABUSE & MENTAL HEALTH SERVS. ADMIN., <https://bit.ly/2jT6nG1> (last visited Mar. 18, 2019) [hereinafter *National Survey on Drug Use*].

43. *Id.*

approximately 7,000 new marijuana users.⁴⁴ The National Institute for Drug Abuse (“NIDA”)⁴⁵ is the research branch of the National Institutes of Health (“NIH”).⁴⁶ NIDA, which is dedicated to “advanc[ing] science on the causes and consequences of drug use and addiction and to apply[ing] that knowledge to improve individual and public health,”⁴⁷ estimates that 22.2 million Americans use marijuana each month.⁴⁸ Despite its rapid growth, some facts about marijuana use remain constant. For example, men are much more likely to use marijuana than women—and this gender gap has recently expanded.⁴⁹

Growing marijuana support, markets, and consumption are a global phenomenon. According to the World Health Organization (“WHO”), the annual rate of marijuana consumption worldwide is approximately 147 million individuals or nearly 2.5% of the global population.⁵⁰ For example, as of April 2017, Iceland reported the highest rate of cannabis use (18.3% of the population), with Nigeria (14.2% of the population), Canada (12.7% of the population), New Zealand (11% of the population), and Spain (9.2% of the population) also reporting significant consumption rates.⁵¹ Medical marijuana is currently legal in Canada, Australia, the Netherlands, France, Uruguay, Romania, Chile, the Czech Republic, Columbia, and Jamaica.⁵² Marijuana is the third most commonly used recreational drug worldwide, following alcohol and tobacco.⁵³

44. Alejandro Azofeifa et al., *National Estimates of Marijuana Use and Related Indicators—National Survey on Drug Use and Health, United States, 2002–2014*, MORBIDITY & MORTALITY WKLY. REP. SURVEILLANCE SUMMARIES, Sept. 2, 2016, at 1, 1, <http://bit.ly/2GeopQN>.

45. See NAT’L INST. ON DRUG ABUSE, <https://bit.ly/1MNIOtZ> (last visited Mar. 18, 2019).

46. See NIH Organization, NAT’L INSTS. OF HEALTH, <https://bit.ly/2iaGL8O> (last visited Dec. 11, 2018).

47. National Institute on Drug Abuse (NIDA), NAT’L INSTS. OF HEALTH, <https://bit.ly/2Ifv75M> (last updated Nov. 28, 2018).

48. NAT’L INST. ON DRUG ABUSE, MARIJUANA RESEARCH REPORT 7, <http://bit.ly/2Pyw8Zj> (last updated June 2018) [hereinafter NIDA, MARIJUANA].

49. *Id.*

50. Mary Barna Bridgeman et al., *Medicinal Cannabis: History, Pharmacology, And Implications for the Acute Care Setting*, 42 PHARMACY & THERAPEUTICS 180, 180 (2017).

51. Gavin Haines, *Mapped: The Countries that Smoke the Most Cannabis*, THE TELEGRAPH (Apr. 20, 2017, 1:00 PM), <http://bit.ly/2zTsnJ7>.

52. Sean Williams, *10 Countries (Aside from the U.S.) Where Some Form of Medical Marijuana is Legal*, MOTLEY FOOL (May 15, 2016), <http://bit.ly/2RToWsC>.

53. LESLIE L. IVERSEN, THE SCIENCE OF MARIJUANA 188 (2d ed. 2008).

C. *Introduction to Cannabis Science*

Despite widespread and growing use, we do not know if marijuana is efficacious or safe.⁵⁴ In the 1970s, when the federal government deemed marijuana to be as addictive and medically useless as heroin, LSD, and methylenedioxymethamphetamine (ecstasy) by making it a Schedule I drug, the DEA effectively blocked scientific research.⁵⁵ State legalization efforts typically ignore the paucity of the scientific evidence and do not seek Schedule I removal. This makes sense because neither legislators nor pro-marijuana voters would benefit from new information about health risks and the lack of evidence of health benefits has not diminished marijuana's growing appeal. Over the past half-century, as cannabis use has grown and botanical geneticists continue to tinker with its chemical components, scientists' efforts to understand how currently available marijuana products affect the human brain and body have been stymied. As a result, we find ourselves with a drug in everyday use but an inadequate body of scientific evidence to understand its myriad potential risks including: short and long-term brain effects (including potential effects on the developing brain); lung-health and/or cardiac implications; chemical interactions with alcohol and other legal and illegal drugs; fertility, safe pregnancy and/or breastfeeding concerns; and exposure to secondhand marijuana smoke.⁵⁶

54. There are "potentially severe cognitive, psychotomimetic, and substance abuse-related adverse effects associated with Δ 9-tetrahydrocannabinol (THC) exposure that must be taken seriously, especially in young or cannabis-naïve patients." Perry G. Fine & Mark J. Rosenfeld, *The Endocannabinoid System, Cannabinoids, and Pain*, RAMBAM MAIMONIDES MED. J., Oct. 2013, at 1, 4, <http://bit.ly/2PySmun> (noting that "fatalities have not been reported directly related to the toxicity of any cannabinoid, even with extremely high dosing"); see also Loria, *supra* note 27 ("More research would also shed light on the risks of marijuana. Even if there are legitimate uses for medicinal marijuana, that doesn't mean all use is harmless.").

55. Loria, *supra* note 27 ("[S]cientists say that limitations on marijuana research mean we still have big questions about its medicinal properties. In addition to CBD and THC, there are another 400 or so chemical compounds, more than 60 of which are cannabinoids. Many of these could have medical uses. But without more research, we won't know how to best make use of those compounds."); *Cannabis and Cannabinoids (PDQ)—Health Professional Version: General Information*, NAT'L CANCER INST., <http://bit.ly/2RQL86L> (last updated Aug. 16, 2018) (noting that any scientist seeking to engage in clinical cannabis research in the United States must "file an Investigational New Drug (IND) application with the FDA, obtain a Schedule I license from the U.S. Drug Enforcement Administration, and obtain approval from the National Institute on Drug Abuse").

56. Charles W. Webb & Sandra M. Webb, *Therapeutic Benefits of Cannabis: A Patient Survey*, 73 HAW. J. MED. PUB. HEALTH 109, 109 (2014) (noting that "[c]linical research regarding the therapeutic benefits of cannabis ("marijuana") has been almost non-existent in the United States since cannabis was given Schedule I status in the Controlled Substances Act of 1970").

The federal government's Schedule I stranglehold is not a complete ban; but it has significantly hindered the development of meaningful widespread research. For example, only 11 marijuana studies were authorized from 2000 to 2009.⁵⁷ To make matters worse, NIDA,⁵⁸ which must approve all cannabis research,⁵⁹ restricts all research to a single strain of research-grade pot grown only at the University of Mississippi. NIDA provides authorized labs only with what has been described as a "micronized powder" form of this Mississippi-grown cannabis.⁶⁰ Unsurprisingly, researchers regularly complain that this powdered pot is an extremely poor analog for the wide range of cultivated, dispensary-available products.⁶¹

If the research to date reveals anything about the pharmacology of marijuana, we know that it is extremely complex. Pot's main psychoactive chemical is *delta-9-tetrahydrocannabinol* ("THC"), but it also contains over 500 other chemicals with virtually unknown properties and effects.⁶² Without a solid foundational understanding of pot's chemical composition, we cannot reliably measure the impact of basic scientific variables including: (1) the ever-expanding variety of delivery methods (e.g. smoking, vaping, edibles); (2) THC and other chemical potency variations; (3) physiological and psychological distinctions

57. *Id.*

58. Mikos, *supra* note 16 at 1433–34.

59. In fiscal year 2017, the NIH through NIDA "supported 330 projects totaling almost \$140 million on cannabinoid research." *NIH Research on Marijuana and Cannabinoids*, NAT'L INST. ON DRUG ABUSE, <http://bit.ly/2C51Gmf> (last updated May 2018); see also *Estimates of Funding for Various Research, Condition, and Disease Categories (RDC)*, NAT'L INST. ON DRUG ABUSE (May 18, 2018), https://report.nih.gov/categorical_spending.aspx.

60. THE HEALTH EFFECTS OF CANNABIS, *supra* note 33, ch. 15 (noting that, "[b]ecause of restrictions on production and vicissitudes in supply and demand, federally produced cannabis may have been harvested years earlier, is stored in a freezer (a process that may affect the quality of the product).").

61. Caleb Hellerman, *Scientists Say the Government's Only Pot Farm Has Moldy Samples—and No Federal Testing Standards*, PBS NEWS HOUR (Mar. 8, 2017, 3:55 PM), <https://to.pbs.org/2GcrJfp> (citing researchers' concerns that pot ordered for research purposes "didn't resemble cannabis" and "didn't smell like cannabis," and that some "samples were contaminated with mold, while others didn't match the chemical potency . . . requested for the study"); Tom Hesse, *Weak Weed and Red Tape: Marijuana Research is Slow Going*, CHRON. HIGHER EDUC. (Feb. 28, 2017), <https://www.chronicle.com/article/Weak-WeedRed-Tape-/239328> (citing concerns that "the cannabis strain that Mississippi has been providing is so low in THC . . . it's not really possible to do actual use-patterns analysis . . . [N]o one uses that. Everyone's been using really powerful stuff."); Sara Reardon, *Marijuana gears up for production high in US labs*, 519 NATURE 269, 269–70 (2015); Sarah See Stith & Jacob Miguel Vigil, *Federal barriers to cannabis research*, 352 SCIENCE 1182, 1182 (2016).

62. Hellerman, *supra* note 61; see also MARTIN BOOTH, CANNABIS: A HISTORY 5–6 (2004) (noting that, "[o]f the approximately 460 known chemical constituents of cannabis, more than sixty have the molecular structure of a cannabinoid . . .").

between habitual and occasional users; (4) user age differences; (5) second-hand effects; and/or (6) drug and alcohol interactions. The paucity of the current evidence base has been specifically criticized by the WHO, which recently opined that “more research is needed on the basic neuropharmacology of THC and other cannabinoids.”⁶³

In this scientific evidence void, our continued reliance on copycat laws borrowed from regulations governing alcohol or other drugs (such as opioids) is inherently suspect. Different intoxicants have distinct chemical properties and effects, most notably alcohol’s steady metabolism rate (which provides lawmakers with an empirically accurate base for extrapolating an impairment timeline)⁶⁴ and the chemical consistency of prescription narcotics. Cannabis impairment assessment, which I intend to address in a forthcoming companion article, is especially tricky because we have limited data on the measurement of cannabinoids in various bodily fluids, no scientific consensus on the correlation of cannabinoid levels to impairment effects (i.e., human judgment, motor coordination, and reaction time), and no agreement on valid roadside measurement methods or devices.

D. *Introduction to the Politics of Legalization*

Legalizing pot, before we have begun to understand its potential psychopharmacological and physiological effects, is a public health and policy problem because it is “counterintuitive to the mission of our governmental agencies.”⁶⁵ To make evidence-based decisions, policymakers first need “clinical researchers to acquire safety and efficacy data on products in the marketplace.”⁶⁶ But even accurate scientific information cannot always steer public policy in a climate of divisive and inconsistent party politics. As discussed below, the Obama and Trump administrations may have differed on the enforcement of criminal sanctions, but they both have ignored the recommendation of the American Medical Association to remove marijuana from Schedule I to permit clinical research and facilitate the development of new cannabis-

63. *Cannabis*, WORLD HEALTH ORG., http://www.who.int/substance_abuse/facts/cannabis/en/ (last visited Mar. 18, 2019) [hereinafter WHO, *Cannabis*].

64. *Marijuana Research: Frequently Asked Questions*, UNIV. OF MISS., <https://pharmacy.olemiss.edu/marijuana/> (last visited Mar. 18, 2019).

65. *Summary of Request for Information (RFI) Regarding Varieties of Marijuana and Marijuana Products for Research*, NAT’L INST. ON DRUG ABUSE, <http://bit.ly/2Qxz3a0> (last updated Nov. 2016) [hereinafter NIDA, *Summary of RFI*].

66. *Id.*

derived medicines.⁶⁷ State legalization provides marijuana to the people, but does nothing to advance the science.

The messy politics of marijuana science transcends the partisan divide. “Post-truth” America has an increasingly uncomfortable relationship with science, evidence, and facts. Stephen Colbert introduced the word “truthiness,” into the vernacular in 2005—deftly capturing the political zeitgeist of an American public increasingly “divided between those who think with their head and those who know with their heart.”⁶⁸ More recently, cognitive scientists Hugo Mercier and Dan Sperber suggest that facts are decreasingly important, not merely because human ability to reason is inherently flawed; but because we increasingly use reason principally to critique the ideas of others.⁶⁹ Reason serves just two functions, “that of producing reasons for justifying oneself, and that of producing arguments to convince others.”⁷⁰ The current perfect storm of scientific ignorance, empirical relativism, and (if Mercier and Sperber are correct) the diminished role of reason, impacts all law and science questions—from global climate change and environmental safety to intimate questions of reproductive health.⁷¹ Although legal marijuana may draw bipartisan support,⁷² voters’ and legislators’ common ground on a highly lucrative new local market does *not* demonstrate values-based bipartisan agreement or a shared commitment to evidence-based public policy.

A truthiness approach to marijuana legalization also fits with our increasing about basic science. In surveys conducted over the past decade, Americans consistently reveal a shocking unfamiliarity with middle-school level scientific facts and methods. Among adults, 53% do not know how long it takes for the earth to revolve around the sun, 41% believe that humans and dinosaurs lived together at the same time, and 47% cannot even roughly approximate how much of the earth’s surface is covered with

67. See COUNCIL ON SCI. & PUB. HEALTH, AM. MED. ASS’N, REP. NO. 3-I-09, USE OF CANNABIS FOR MEDICINAL PURPOSES 2 (2009), <http://bit.ly/2B9CXeJ>.

68. SOPHIA A. MCCLENNEN, COLBERT’S AMERICA: SATIRE AND DEMOCRACY 123 (2011) (ebook).

69. HUGO MERCIER & DAN SPERBER, THE ENIGMA OF REASON 7–11 (2017).

70. *Id.* at 8.

71. Andrew Sullivan, *When Two Tribes Go to War*, N.Y. MAG. (Feb. 2, 2018, 9:35 AM), <https://nym.ag/2PuITUV>.

72. Astead W. Herndon, *Meet Colorado’s New Single-Issue Voters: The Cannabis Community*, N.Y. TIMES (June 25, 2018), <https://nyti.ms/2LaxgSo> (“In the 2018 midterm elections, [cannabis] industry leaders are hoping that the spread of marijuana legalization will lead to the birth of a new single-issue voter: People who, like some Medicare recipients or gun owners, are motivated to cast ballots based on the benefits they have received or fears about any government rollback of access.”).

water.⁷³ Under these circumstances, it is not surprising that marijuana proponents appear uninterested in the science. Scientific ignorance and disinterest, a growing disinclination to question our own beliefs, and instant access to all sorts of scientific-sounding information on the internet are a toxic combination that is “dramatically reshap[ing] our relationship to the world of knowledge” by “unmoor[ing] information from the context required to understand it.”⁷⁴ The regular consumption of partisan information (whether on Facebook, Breitbart, or CNBC) without debate or context has been shown to exacerbate critical reasoning deficits on all evidence-based questions—even those seemingly unrelated to party politics.⁷⁵

E. Why the Science and Politics of Legal Pot Matters

According to the philosopher Susan Haack, “[t]he core epistemological values of science are rooted in the central, defining concern of inquiry generally: finding things out.”⁷⁶ Science invariably works within society, but when the surrounding culture works to “undermine the norms of evidence sharing and respect for evidence, or . . . erode or compromise them, the integrity of science comes under threat.”⁷⁷ But even if we could overcome truthiness obstacles, because the marijuana movement is driven by users and profit-seeking legislators, proponents have no reason to advocate for better scientific research. If medical and/or psychological risks are real, these will only create impediments. But the paucity of the medical evidence is a critical legal and policy problem. Without more comprehensive information on the health benefits and palliative effects of marijuana, doctors, lawmakers, voters, and consumers cannot make scientifically sound decisions. The current “lack of evidence-based information on the health effects of cannabis and cannabinoids

73. *American Adults Flunk Basic Science*, SCIENCE DAILY (Mar. 13, 2009), <http://www.sciencedaily.com/releases/2009/03/090312115133.htm>.

74. SETH MNOOKIN, *THE PANIC VIRUS* 5–8 (2011) (describing the promulgation of the increasingly popular and dangerous myth that MMR vaccines cause autism).

75. Jeff Cirillo, *Warren, Gardner Unveil Marijuana Bill Easing Federal Enforcement*, ROLL CALL (June 7, 2018, 2:11 PM), <http://bit.ly/2RN0KrY>. *But see* ANDREW GUESS ET AL., KNIGHT FOUND., *AVOIDING THE ECHO CHAMBER ABOUT ECHO CHAMBERS: WHY SELECTIVE EXPOSURE TO LIKE-MINDED POLITICAL NEWS IS LESS PREVALENT THAN YOU THINK* (Feb. 2018), <http://bit.ly/2rzytK5> (concluding that “there is diversity in the sources and media outlets to which people pay attention,” that many people “only pay attention to politics at critical moments, or hardly at all,” and that “[e]ndorsements from friends on social media and algorithmic rankings can influence the information people consume, but these effects are more modest and contingent than many assume”).

76. Susan Haack, *The Integrity of Science: What it Means and Why it Matters*, 11 *COLEÇÃO BIOÉTICA* 9, 10 (2006) (Portugal), <http://perma.cc/B9M7-2AD2>.

77. *Id.*

[itself] poses a public health risk”⁷⁸ with significant and immediate legal and regulatory ramifications.

This Article tackles the science and politics of legal pot. As an inquiry into basic principles, it specifically rejects the currently faddish “unintended consequences” legal academic lens. A quick look at Westlaw reveals that, in this context, these unintended consequences approach has spawned myriad academic “what if” prognostications relating to regulatory problems of varying interest and importance (e.g., employment, expungement, land use, trademark and zoning problems). This Article refocuses on the fundamental legal, political and practical meaning of increasing public access to a chemical substance we have not, and currently cannot, properly research. The goals are to explore the basic science of marijuana, to explain why gathering more evidence is essential to a legitimate regulatory scheme, and to expose the current legal and political obstacles to better science and better public health policy decisions.

The Article is organized as follows. Part I explains the cannabis basics—describing what marijuana is, where it comes from, and how it is used medically and recreationally. Part II provides a user-friendly guide to the current state-of-the-science of marijuana highlighting the Rumsfeldian “known unknowns” and “unknown unknowns,”⁷⁹ including marijuana’s medical potential and its short and long-term psychopharmacological effects. Part III explores the evolving law of marijuana—briefly examining the relevant Constitutional questions including federal-state preemption, the Commerce Clause, the Tenth Amendment’s Anti-Commandeering doctrine, and congressional funding power. Finally, Part IV anticipates the future of legal pot and predicts that the current simulacrum of bipartisanship does not reflect actual shared understanding and cannot insulate marijuana from our increasingly tribalized and scientifically ignorant approach to all evidence-based questions of law and policy.

II. THE BASICS

A. *The History of Marijuana*

According to the National Institute on Drug Abuse [NIDA],

Marijuana—also called *weed*, *herb*, *pot*, *grass*, *bud*, *ganja*, *Mary Jane*, and a vast number of other slang terms—is a greenish-gray mixture of the dried flowers of *Cannabis sativa* [and] some people smoke

78. THE HEALTH EFFECTS OF CANNABIS, *supra* note 34, ch. 15.

79. David A. Graham, *Rumsfeld’s Knowns and Unknowns: The Intellectual History of a Quip*, THE ATLANTIC (Mar. 27, 2014), <http://bit.ly/2LdA553>.

marijuana in hand-rolled cigarettes called *joints*; in pipes, water pipes (sometimes called *bongs*), or in *blunts* (marijuana rolled in cigar wraps).⁸⁰

Cannabis is the generic name for hemp. The precise etymology of “marijuana” is unknown, but it has been traced to an Aztec slang word for “brothel.”⁸¹

The geographic origin of marijuana is also unknown, although most studies suggest that it probably evolved in central Asia.⁸² Cannabis use has a very long history, and we can (somewhat) reliably trace its origins to the ancient world. A 2017 meta-analysis of marijuana’s history and pharmacology reports that cannabis was first described “more than 5,000 years ago in what is now Romania,” but the first direct evidence of use (THC found in ashes) dates to 400 A.D.⁸³ Cannabis use in the U.S. began during the 19th and early 20th centuries. Marijuana was legal to grow and consume until the 1910s, when states first began criminalize the drug.⁸⁴ But starting in the 1930s, “every state . . . banned the cultivation, distribution, and possession of marijuana for non-medical purposes.”⁸⁵

The first federal restrictions appeared in the 1937 Marihuana Tax Act.⁸⁶ Additional efforts to control marijuana were included in the Boggs and Narcotic Control Acts of 1951 and 1956 and in the 1970 Controlled Substances Act (“CSA”).⁸⁷ As noted above, a half century ago the CSA classified marijuana as a Schedule I drug based on a congressional finding that pot has no possible acceptable medical use. This legislative presumption has precluded robust scientific research on marijuana’s effects and continues (confusingly) to make pot illegal under federal law, in every state where it has been legalized.

Marijuana was initially criminalized for highly problematic political and social reasons. The racist and xenophobic origins of the mid-twentieth century marijuana prohibition movement are well documented.⁸⁸ Early cannabis criminalization coincided with an influx of Mexican immigrants

80. NIDA, MARIJUANA, *supra* note 48, at 5.

81. *Id.*

82. BOOTH, *supra* note 62, at 2–3.

83. Bridgeman et al., *supra* note 50, at 180.

84. Erwin Chemerinsky et al., *Cooperative Federalism and Marijuana Regulation*, 62 UCLA L. REV. 74, 81 (2015).

85. Robert A. Mikos, *On the Limits of Supremacy: Medical Marijuana and the States’ Overlooked Power to Legalize Federal Crime*, 62 VAND. L. REV. 1421, 1427 (2009).

86. *Id.*

87. *Id.*; Chemerinsky et al., *supra* note 84, at 80 (“It has been well documented that the move to regulate marijuana was motivated in large part by racism and xenophobia.”).

88. Alex Halperin, *Marijuana: Is It Time to Stop Using a Word With Racist Roots?*, THE GUARDIAN (Jan. 29, 2018, 5:00 AM), <http://bit.ly/2Quxidy>.

to the U.S. at the turn of the last century.⁸⁹ As Harry Anslinger, Commissioner of the Federal Bureau of Narcotics from 1930-1962, infamously asserted in a tirade against the drug: “There are 100,000 total marijuana smokers in the US, and most are Negroes, Hispanics, Filipinos and entertainers. Their Satanic music, jazz and swing result from marijuana use. This marijuana causes white women to seek sexual relations with Negroes, entertainers and any others.”⁹⁰ This shameful past has prompted some legalization proponents to propose that the name “marijuana” be abandoned to better distance the drug from its shameful past.⁹¹

Modern cannabis originated in the 1970s in California “when professional breeders began to select the most potent, THC-rich plants for the first time.”⁹² Before modern cultivation, most marijuana was imported as “hashish resin, made of mixed populations of plants from parts of Asia, Africa, and the Caribbean, containing varying amounts of both CBD and THC.”⁹³ A half-century ago, almost all of the marijuana consumed in the United States was imported, but over the past few decades, this has changed dramatically.⁹⁴ Today we see a near-complete shift to American-grown marijuana, with California growing 80% of the cannabis consumed across the U.S.⁹⁵ The 50 year-old movement towards domestic marijuana coincides with significant horticultural and genetic advances as U.S. growers began “selectively breeding THC-rich plants . . . in the quest to make ever stronger cannabis.”⁹⁶ These efforts have been wildly successful, resulting in scientific consensus that deliberate new horticultural methods have caused a significant rise in THC levels in cultivated marijuana.⁹⁷

B. Modern Marijuana

Marijuana is currently available in a wide variety of strains and incorporated into a range of products. Different cannabis strains “have

89. Alyssa Pagano, *The Racist Origins of Marijuana Prohibition*, BUS. INSIDER (Mar. 2, 2018, 10:57 AM), <https://read.bi/2QTBMu0>.

90. *Id.*

91. Halperin, *supra* note 88.

92. Tom Ireland, *The new strain of cannabis that could help treat psychosis*, THE GUARDIAN (Nov. 15, 2014, 7:04 PM), <https://www.theguardian.com/society/2014/nov/16/new-strain-cannabis-treat-psychosis-schizophrenia-gw-pharmaceuticals-david-potter>.

93. *Id.*

94. Emily Brady, *How Humboldt Became America's Marijuana Capital*, SALON (June 30, 2013, 4:30 PM), <http://bit.ly/2Bdi967>.

95. *Id.*

96. Ireland, *supra* note 92; *see also* Brady, *supra* note 95. *See generally* Zlatko Mehmedic et al., *Potency Trends of Δ⁹-THC and Other Cannabinoids in Confiscated Cannabis Preparations from 1993 to 2008*, 55 J. FORENSIC SCI. 1209 (2010).

97. Mehmedic et al., *supra* note 96, at 1216.

varying chemical components.”⁹⁸ In addition to different strains, marijuana is also available in a variety of forms, including sinsemilla, an especially potent variety derived from specially tended female plants, and concentrated resins such as hash oil, budder, and shatter.⁹⁹ For-profit marijuana analytics companies currently help sellers and buyers differentiate among strains and products. According to a recent *Wired* magazine investigative report, pot labs now use “analytical chemistry” (and crowd-sourced reviews) to “quantify 27 of the most prominent of these flavorful, experience-defining molecules.”¹⁰⁰

Legitimate cannabis genetic research could have significant implications for better understanding pot’s medicinal and palliative potential and its psychopharmacological effects. But horticultural geneticists complain that their work is impeded by pot’s Schedule I status. Unlike “[e]very other commercially important agricultural plant in the world [which] has had a ton of research done on it,” marijuana “has so much variation, and nobody knows what that variation’s all about.”¹⁰¹ Plant biologists cannot research the basic bases for genetic differences, which is “what you need if you plan to breed scientifically, to enhance the qualities the market might pay for,”¹⁰² despite the fact that more genetic data would also be useful for medical research because different chemicals “ameliorate clinical symptoms differently.”¹⁰³ Ironically, cannabis cultivators seeking solely to enhance THC psychoactivity have compounded these problems. By crossbreeding to achieve the goal of stronger marijuana, modern marijuana farmers inadvertently create genetic sequencing complications by developing strains with multiple copies of the gene that synthesizes THC.¹⁰⁴

98. Janet Wells, *Dazed and Confused: Marijuana Legalization Raises the Need for More Research*, UNIV. OF CAL. S.F. (June 20, 2017), <http://bit.ly/2rAVb4h>.

99. NIDA, MARIJUANA, *supra* note 48, at 5.

100. Katie M. Palmer, *A New Crop of Marijuana Geneticists Sets Out to Build Better Weed*, WIRED (Apr. 20, 2016, 7:00 AM), <https://www.wired.com/2016/04/the-science-of-marijuana/>.

101. *Id.* (quoting Reggie Gaudino, Vice President of Scientific Operations at Steep Hill, a marijuana analytics company).

102. *Id.*

103. Wells, *supra* note 98.

104. Neel V. Patel, *Cannabis gets its high-inducing power from ancient viruses*, POPULAR SCIENCE (Nov. 30, 2018), <https://www.popsoci.com/ancient-viruses-cannabis-genome>.

C. *How Does Marijuana Work?*

1. Cannabinoids

The cannabis plant “produces a resin containing psychoactive compounds called cannabinoids, in addition to other compounds found in plants, such as terpenes and flavonoids.”¹⁰⁵ In the cannabis plant, “[t]he highest concentration of cannabinoids is found in the female flowers.”¹⁰⁶

More specifically, “cannabinoid” describes “a pharmacological class of about 60 naturally occurring compounds (phytocannabinoids) found in plants of the genus *Cannabis* (i.e. marijuana and hemp) and structurally related synthetic analogues.”¹⁰⁷ Cannabinoids are biochemically significant because these are the “chemicals that act on the brain’s cannabinoid receptors, part of a system that regulates a variety of physiological processes including pain sensation, mood, memory and appetite.”¹⁰⁸ To date, over 100 cannabinoids have been identified.¹⁰⁹ Pot’s main psychoactive cannabinoid is THC.¹¹⁰ THC levels have varied widely over time and continue to vary among different products. For example, fifteen years ago “the average THC content in weed was about 3 percent by weight.”¹¹¹ Today, THC “levels top out at a whopping 37 percent.”¹¹² In addition to THC, pot “contains more than 500 other chemicals, including more than 100 compounds that are chemically related to THC.”¹¹³

The basic biochemical explanation for how THC affects the brain begins with cannabinoid receptors, which are located “in many key regions, including the amygdala (responsible for processing memory and emotional reactions) as well as the basal ganglia and cerebellum (responsible for motor control, among other things).”¹¹⁴ Cannabinoid receptors also exist throughout the brain and body within cell membranes and control a host of physiological and psychological functions.¹¹⁵ THC

105. NAT’L CANCER INST., *supra* note 55.

106. *Id.*

107. Fine & Rosenfeld, *supra* note 54.

108. Ireland, *supra* note 92.

109. Mahmoud A. ElSohly & Waseem Gul, *Constituents of Cannabis Sativa*, in HANDBOOK OF CANNABIS 3 (Roger Pertwee ed., 2014).

110. NAT’L CANCER INST., *supra* note 55.

111. Palmer, *supra* note 100.

112. *Id.*

113. NIDA, MARIJUANA, *supra* note 48, at 5.

114. Clay Dillow, *How Will Police Regulate Stoned Driving?*, POPULAR SCIENCE (June 4, 2013), <https://www.popsci.com/science/article/2013-05/now-recreational-marijuana-now-legal-two-states-how-will-police-regulate-stoned-driving>.

115. See Megan Scudellari, *Your Body is Teeming with Weed Receptors*, THE SCIENTIST (July 17, 2017), <http://bit.ly/2rxwyWt>.

has psychoactive effects because it alters the chemical messages sent to specific brain areas, including those that “regulate appetite, memory, fear extinction, motor responses, and posture such as the hippocampus, basal ganglia, basolateral amygdala, hypothalamus, and cerebellum.”¹¹⁶

2. The Endocannabinoid System

Although THC does not occur naturally in the body, THC acts directly on the entire endocannabinoid system (“ECS”), which is comprised of “cannabinoid receptors along with ‘endogenous cannabinoids (endocannabinoids)[] and the enzymes responsible for the synthesis and degradation of the endocannabinoids.”¹¹⁷ Because the chemical structure of THC is very similar to the brain chemical *anandamide*, which binds to THC receptors,¹¹⁸ the body “recognize[s] THC and [allow it] to alter normal brain communication.”¹¹⁹ These alterations are not just psychoactive, but can include effects on appetite, pain, motor-learning, and inflammation because the ECS “is a widespread neuromodulatory system that plays important roles in central nervous system [(CNS)] development, synaptic plasticity, and the response to endogenous and environmental insults.”¹²⁰ Endocannabinoids, which our bodies make naturally, “function as *neurotransmitters* because they send chemical messages between nerve cells (*neurons*) throughout the nervous system. They affect brain areas that influence pleasure, memory, thinking, concentration, movement, coordination, and sensory and time perception.”¹²¹ THC is considered an exogenous cannabinoid (phytocannabinoid) because the body does not make it, but THC has a similar ability to stimulate neural receptors.¹²²

[R]ecent work has provided evidence that the endocannabinoid system . . . isn’t exclusive to the brain. It is present everywhere in the body that scientists have looked: the heart, liver, pancreas, skin, reproductive tract, you name it. And disrupted endocannabinoid signaling has been associated with many disorders, including diabetes, hypertension, infertility, liver disease, and more. “There is so much that’s still unknown about this system. It looks to be regulating every physiological system in the body.”

Id. (quoting Nick DiPatrizio, Assistant Professor at U.C. Riverside, School of Medicine).

116. THE HEALTH EFFECTS OF CANNABIS, *supra* note 33, at 46–47.

117. Hui-Chen Lu & Ken Mackie, *An Introduction to the Endogenous Cannabinoid System*, 79 BIOLOGICAL PSYCHIATRY 516, 516 (2016).

118. NIDA, MARIJUANA, *supra* note 48, at 9.

119. *Id.*

120. Lu & Mackie, *supra* note 117, at 516.

121. NIDA, MARIJUANA, *supra* note 48, at 9.

122. See Flora E. Kovacs et al., *Exogenous and Endogenous Cannabinoids Suppress Inhibitory Neurotransmission in the Human Neocortex*, 37 NEUROPSYCHOPHARMACOLOGY 1104, 1104 (2012).

D. *How is Marijuana Used?*

1. Cannabis Products

Marijuana is—roughly speaking—used for two different purposes: (1) medicinal treatment and palliative care for a wide range of disorders and conditions, and (2) fun.

Medicinal marijuana users and recreational users typically fit different profiles. Medical users are often older (typically middle-aged) and are frequently diagnosed with debilitating illnesses (such as cancer), neurological or musculoskeletal problems, or chronic infections.¹²³ Marijuana's medical potential is discussed in more detail below, but access to both medical and recreational marijuana is limited to those who can afford to pay out of pocket, because even in states where medical marijuana has been legalized, marijuana is a cash-only business with no possibility of insurance coverage.

Medicinal and recreation cannabis is consumed in a variety of ways.

These include smoking or inhaling from cigarettes (joints), pipes (bowls), water pipes (bongs, hookahs), and blunts (cigars filled with cannabis); eating or drinking food products and beverages; or vaporizing the product. These different modes are used to consume different cannabis products, including cannabis “buds” (dried cannabis flowers); cannabis resin (hashish, bubble hash); and cannabis oil (butane honey oil, shatter, wax, crumble).¹²⁴

The dizzying array of marijuana consumption options can have a distinct psychopharmacological impact.

2. Consumption Methods

Whether one uses pot as a medicine or for recreation, the choice of a particular method of marijuana consumption “impact[s] the onset, intensity, and duration of psychoactive effects; effects on organ systems; and the addictive potential and negative consequences associated with use.”¹²⁵ NIDA reports that vaping is increasingly popular.¹²⁶ This may be attributable to the fact that “[v]aporization provides effects similar to smoking while reducing exposure to the byproducts of combustion and possible carcinogens and decreasing adverse respiratory syndromes.”¹²⁷

123. See Alice Robb, *This Is What the Average Medical Marijuana User Looks Like*, NEW REPUBLIC (Jan. 9, 2014), <http://bit.ly/2UIFshh>.

124. THE HEALTH EFFECTS OF CANNABIS, *supra* note 33, at 50.

125. Bridgeman et al., *supra* note 50, at 182.

126. NIDA, MARIJUANA, *supra* note 48, at 5.

127. Bridgeman et al., *supra* note 50, at 182.

When cannabis is smoked or vaped, THC rapidly diffuses to the brain, eliciting a perceived high within seconds or minutes, reaching a peak after about 30 minutes, and subsiding within 2 to 3 hours.¹²⁸ “‘Dabbing,’ a term for flash-vaporizing butane hash oil-based concentrates, has been reported to offer a different and stronger intoxicating effect than smoking/vaping.”¹²⁹ Whether marijuana is smoked, vaped, or dabbed, “THC and other chemicals in the plant pass from the lungs into the bloodstream, which rapidly carries them throughout the body to the brain. The person begins to experience effects almost immediately.”¹³⁰ For users seeking a quick biochemical response, these are preferred consumption methods.

Marijuana consumed in foods or beverages, while also popular, will produce a very different effect. The high is typically delayed—usually appearing after 30 minutes to 2 hours—because the intestine must absorb the drug transport it to the liver.¹³¹ Eating or drinking marijuana can also impact dosing. Edibles “deliver[] significantly less THC into the bloodstream than smoking [or vaping/dabbing] an equivalent amount of the plant. Because of the delayed effects, people may inadvertently consume more THC than they intend to.”¹³² According to NIDA, variable potency rates and the delayed effect of ingestion are common causes of overconsumption.¹³³ The effects of marijuana will typically last a few hours, although detectable amounts of THC can remain in the body for days or even weeks.¹³⁴ However, the choice of a particular consumption method can alter the “duration of the psychotropic effects, the effects on organ systems, and the addictive potential and negative consequences associated with its use.”¹³⁵

Pharmacokinetic research, which explores the absorption, distribution, metabolism, and excretion of drugs, is a generally complicated field.¹³⁶ Confounding factors specific to marijuana research include: (1) problems created by low concentrations of relevant chemical constituents; (2) the rapid and extensive metabolism of THC in the body; and (3) the complexity of separating different compounds of interest from other compounds and biological tissues.¹³⁷ Research into the specific

128. *Id.*

129. THE HEALTH EFFECTS OF CANNABIS, *supra* note 33, at 51.

130. NIDA, MARIJUANA, *supra* note 48, at 8.

131. THE HEALTH EFFECTS OF CANNABIS, *supra* note 33, at 51.

132. NIDA, MARIJUANA, *supra* note 48, at 8; *see also* Bridgeman et al., *supra* note 51, at 182.

133. NIDA, MARIJUANA, *supra* note 48, at 8.

134. *Id.*

135. THE HEALTH EFFECTS OF CANNABIS, *supra* note 33, at 51.

136. *See generally* Marilyn A. Huestis, *Human Cannabinoid Pharmacokinetics*, 4 CHEMISTRY & BIODIVERSITY 1770 (2007) (illustrating the complexity of cannabinoid pharmacokinetics).

137. *See* Bridgeman et al., *supra* note 50, at 182.

pharmacokinetics of marijuana is further complicated by the many different available methods of consumption.¹³⁸ For example, we know that the “[i]nhaled THC causes a maximum plasma concentration within minutes, psychotropic effects start within seconds to a few minutes, reach a maximum after 15-30 minutes, and taper off within 2-3 hours.”¹³⁹ In contrast, psychotropic effects of orally ingested marijuana manifest within “30-90 minutes, reach their maximum after 2-3 hours and last for about 4-12 hours, depending on dose and specific effect.”¹⁴⁰ The increasing array of consumption options poses challenges to the accuracy, consistency, and future validity of any pharmacokinetic findings.

The psychoactive effects of marijuana, which are a factor for both medicinal and recreational users, also vary wildly based on the individual consumer. Common reported experiences “include heightened sensory perception (e.g., brighter colors), laughter, altered perception of time, and increased appetite.”¹⁴¹ In anecdotal reports compiled by NIDA, many people also feel “a pleasant euphoria and sense of relaxation,” although some pot users instead report feeling “anxiety, fear, distrust, or panic.”¹⁴² There are also reports of users who “experience an acute psychosis, which includes hallucinations, delusions, and a loss of the sense of personal identity[,]” especially after taking larger marijuana doses.¹⁴³ A recent study published in the *Journal of Child Psychology and Psychiatry* suggests the possibility that some adolescent marijuana users may experience “psychotic-like experiences” including perceptual abnormalities and delusional thoughts.¹⁴⁴ However, NIDA reports that “unpleasant but temporary reactions [to marijuana] are distinct from longer-lasting psychotic disorders, such as schizophrenia”¹⁴⁵

3. Marijuana Use for Creativity

Many recreational use proponents cite anecdotal evidence of marijuana’s positive effect on creativity. For example, television personality Bill Maher, a long-time cannabis aficionado, posits that marijuana is linked to creativity: “[I]f I’m staring at the blank computer screen sober, I’m thinking, ‘Uh, I don’t want to start this, it’s an

138. See THE HEALTH EFFECTS OF CANNABIS, *supra* note 33, at 385–86.

139. See Franjo Grotenhermen, *Pharmacokinetics and Pharmacodynamics of Cannabinoids*, 42 CLINICAL PHARMACOKINETICS 327, 327 (2003).

140. *Id.*

141. NIDA, MARIJUANA, *supra* note 48, at 8.

142. *Id.*

143. *Id.*

144. See Josiane Bourque et al., *Cannabis Use and Psychotic-Like Experiences Trajectories During Early Adolescence: the Coevolution and Potential Mediators*, 58 J. CHILD PSYCHOL. & PSYCHIATRY 1287, 1360 (2017).

145. *Id.*

ASSIGNMENT!’ Then, as soon as I’m high, which takes about three seconds, it’s, ‘Oh, this is fun! This isn’t an assignment. It’s a GAME.’”¹⁴⁶ Discussions of marijuana’s inspirational potential are also often supported by a list of well-known artist habitués. A quick online search suggests that pot has been the drug of choice for a wide range famous creative people including jazz, rock, folk, country, rap and hip-hop musicians (Louis Armstrong, Bob Dylan, the Beatles, Bob Marley, Willie Nelson, Jerry Garcia, Snoop Dogg, Jay-Z, Lady Gaga, and Wiz Khalifa) and various movie stars (Woody Harrelson, Brad Pitt, and Matthew McConaughey). The three most recent former presidents (Barack Obama,¹⁴⁷ George W. Bush,¹⁴⁸ and Bill Clinton¹⁴⁹) each admitted to (or hinted at) marijuana use, yet the only artist,¹⁵⁰ has never cited marijuana as source of creative inspiration.

Recent research suggests that the link between pot and creativity could be more than anecdotal. Dr. Alice Flaherty, a Harvard neurologist, has explored the effects of both alcohol and marijuana on creativity.¹⁵¹ Her research demonstrates that alcohol inhibits brain activity, although the disinhibiting effects of alcohol may reduce some obstacles to creativity—including self-criticism.¹⁵² According to Dr. Flaherty: “One of the important aspects of creative attention is that it’s often hyper-focused in certain ways—and yet you have to be able to pay attention to relevant things that you’re not expecting. Marijuana seems to help that focus.”¹⁵³ However, a contradictory 2017 study concluded that although cannabis users may “appear to demonstrate enhanced creativity, these effects are an artifact of their heightened levels of openness to experience.”¹⁵⁴ At the

146. *How Pot Helps ‘Real Time’ Host Bill Maher Hit the High Notes*, PAGE SIX (Apr. 14, 2016, 2:15 PM), <https://pge.sx/2RV18XX>.

147. BARACK OBAMA, *DREAMS FROM MY FATHER: A STORY OF RACE AND INHERITANCE* 85–86 (1995) (admitting past marijuana and cocaine use).

148. *Bush Hinted at Use of Marijuana*, BBC NEWS, <http://news.bbc.co.uk/2/hi/americas/4282799.stm> (last updated Feb. 21, 2005).

149. Gwen Ifill, *The 1992 Campaign: New York; Clinton Admits Experiment With Marijuana in 1960’s*, N.Y. TIMES (Mar. 30, 1992), <https://nyti.ms/2UEe9V7>.

150. Eli Watkins & Jamie Gangel, *George W. Bush discovers his ‘inner Rembrandt’ in homage to veterans*, CNN (Feb. 27, 2017, 4:04 PM), <https://cnn.it/2Bb93Xm>.

151. See Adam Wernick, *Do Alcohol and Pot Really Make You More Creative? It Depends*, PUB. RADIO INT’L (Apr. 22, 2014, 4:15 PM), <http://bit.ly/2GgNvOU>. See generally ALICE W. FLAHERTY, *THE MIDNIGHT DISEASE: THE DRIVE TO WRITE, WRITER’S BLOCK, AND THE CREATIVE BRAIN* (2004) (discussing the neurological bases of creativity and the use of drugs to facilitate creative work).

152. See Wernick, *supra* note 151.

153. *Id.*

154. Emily M. LaFrance & Carrie Cuttler, *Inspired by Mary Jane? Mechanisms Underlying Enhanced Creativity in Cannabis Users*, 56 CONSCIOUSNESS & COGNITION 68, 68 (2017).

moment, most of the reports linking marijuana to creativity remain anecdotal.

4. Cannabis Connoisseurship

As recreational marijuana has become more popular, a cottage industry of cannabis connoisseurship has developed. Since 2014, the Denver Post has employed a full-time marijuana editor, whose popular website (www.thecannabist.co) reviews a wide variety of cannabis strains and accouterments.¹⁵⁵ Distinct cannabis character (i.e., flavor, smell, effect, duration) is attributed to the “entourage effect,” the chemical reaction among the hundreds of chemicals including cannabinoids, terpenes, and flavonoids.¹⁵⁶ The cannabis industry promotes the idea that such entourage effects translate into psychopharmacological differences. “In the old days, you’d smoke what you could get . . . Now, there’ll be so much diversity in strains that you’ll be able to pick the exact high you want.”¹⁵⁷ Presumably, these claims also account for differences in dispensary prices.

Unsurprisingly, there is little science to support cannabis distinction claims. In fact, “many scientists see the whole [connoisseurship] thing as a pipe dream. The idea that botanical marijuana creates a synergistic chemical effect, fingerprinting the experience with ‘uplifting’ or ‘relaxing’ or ‘munchy’ notes, is highly contentious.”¹⁵⁸ Designer pot has captured the public imagination, with dispensaries “listing and advertising various cannabinoid ratios and providing detailed terpene profiles in certain strains and products.”¹⁵⁹ Claims of psychoactive effect variations linked to different cannabis strains or varieties, like claims of medical benefits, have never been scientifically validated because “[d]ouble-blind clinical trials, the gold standard for research studies in medicine, have never been conducted to investigate the effects of marijuana’s terpenes or its cannabinoids other than THC.”¹⁶⁰ Even THC, as discussed in more detail herein, has been subjected to only the most preliminary scientific testing.

155. See THE CANNABIST, <https://www.thecannabist.co/> (last visited Mar. 18, 2019) (the website’s footer notes that *The Cannabist* is an edition of *The Denver Post*).

156. Angus Chen, *Some of the Parts: Is Marijuana’s “Entourage Effect” Scientifically Valid?*, SCIENTIFIC AMERICAN (Apr. 20, 2017), <http://bit.ly/2zVGAoX>.

157. Palmer, *supra* note 100 (quoting Reggie Gaudino, Vice President of Scientific Operations at Steep Hill, a marijuana analytics company).

158. Chen, *supra* note 156.

159. *Id.*

160. *Id.*

III. THE SCIENCE OF POT

A. *State-Defined Diseases and Conditions*

In the 30 states that have enacted medicinal marijuana statutes, lawmakers typically specify eligible diseases and conditions. These lists run the gamut. Alabama, one of the most restrictive states, legalized cannabis only for use in state-sponsored clinical research trials aimed at treating severe, debilitating epileptic conditions.¹⁶¹ Michigan, in contrast, recently became one of the most permissive states when it expanded its medical authorization to 22 different conditions including: PTSD, Cancer, Glaucoma, HIV, AIDS, Hepatitis C, Amyotrophic Lateral Sclerosis, Crohn's disease, agitation of Alzheimer's disease, Nail Patella, Autism, chronic pain, Colitis, Inflammatory Bowel Disease, Obsessive Compulsive Disorder, Parkinson's, Rheumatoid Arthritis, spinal cord injury, Tourette's syndrome, and Ulcerative Colitis.¹⁶²

In the more permissive states, a specific diagnosis may not be required to obtain legal medical cannabis. For example, in addition to a long list of eligible diseases and conditions, California includes a catchall provision to accommodate:

Any other chronic or persistent medical symptom that either: (A) Substantially limits the ability of the person to conduct one or more major life activities as defined by the Americans with Disabilities Act of 1990 (B) If not alleviated, may cause serious harm to the patient's safety or physical or mental health.¹⁶³

Like California, Michigan has legalized medicinal marijuana to treat any "chronic or debilitating disease or medical condition . . . that produces . . . cachexia or wasting syndrome; severe and chronic pain; severe nausea; seizures (including but not limited to those characteristic of epilepsy); or severe and persistent muscle spasms (including but not limited to those characteristic of multiple sclerosis or arthritis)."¹⁶⁴ As new states expand their qualifying conditions to include more diseases/conditions and generalized pain and symptomology, more people will start using marijuana, despite the fact that half-century old obstacles to researching marijuana's treatment or palliative efficacy will likely remain in place.

161. See *UAB Cannabidiol Program*, UNIV. OF ALA. BIRMINGHAM SCH. OF MED., <http://bit.ly/2PBpEJa> (last visited Mar. 18, 2019).

162. See *Michigan Medical Marijuana Laws*, US LEGAL, <https://bit.ly/2qyrO2l> (last visited Mar. 18, 2019).

163. CAL. HEALTH & SAFETY CODE ANN. § 11362.7(12)(A)–(B) (West 2018).

164. See US LEGAL, *supra* note 162.

B. *Obstacles to Medical Research*

1. Research-Grade Pot

Since the 1970 enactment of the CSA, the federal government has strictly regulated scientific marijuana research.¹⁶⁵ As noted above, pot's Schedule I status combined with NIDA regulations limiting researchers to the University of Mississippi grown "micronized powder" cannabis, have stymied robust scientific inquiry.¹⁶⁶ NIDA's research-grade marijuana "is less potent than the pot offered at dispensaries"¹⁶⁷ because NIDA limits distribution to "low-THC, zero-CBD strains."¹⁶⁸ According to one Colorado-based PTSD researcher, local dispensaries offer products with THC levels as high as 30%¹⁶⁹ and although NIDA claims to provide a product with 13% THC levels, independent testing reveals that NIDA's research-grade marijuana has inconsistent THC levels, which are often lower than 13%.¹⁷⁰ This complicates efforts to research the effects of the marijuana products people actually use. The NIDA marijuana "available through the federal system do[es] not sufficiently reflect the variety of products used by consumers, [so] research conducted using cannabis provided by NIDA may lack external validity."¹⁷¹

In addition to lower THC levels, research-grade cannabis is chemically distinct from medical and recreational "whole-plant marijuana, which contains hundreds of active ingredients with complicated synergistic and inhibitory interactions."¹⁷² NIDA marijuana also "differs from other products offered at dispensaries."¹⁷³

For years, "there has been an effort to petition the government to expand and improve the supply of research cannabis, as researchers and experts complain about not only the quantity of cannabis grown for research purposes, but also its quality and the diverse array of potency, chemical composition (cannabinoid profiles), and vehicles of consumption

165. See Webb & Webb, *supra* note 56.

166. See THE HEALTH EFFECTS OF CANNABIS, *supra* note 33, ch. 15.

167. Marisa Taylor & Melissa Bailey, *Medical Marijuana's 'Catch-22': Limits on Research Hinder Patient Relief*, NAT'L PUB. RADIO (Apr. 7, 2018), <https://n.pr/2HMw6uN>.

168. Wells, *supra* note 98.

169. See Christopher Ingraham & Tauhid Chappell, *Government Marijuana Looks Nothing Like the Real Stuff. See for Yourself*, WASH. POST (Mar. 13, 2017), <https://wapo.st/2RI3RB7>.

170. See *id.*

171. THE HEALTH EFFECTS OF CANNABIS, *supra* note 33, at 383.

172. Ilana M. Braun et al., *Study Reveals That Many Oncologists Recommend Medical Marijuana Clinically Despite Not Feeling Sufficiently Knowledgeable to Do So*, DANA-FABER CANCER INST. (May 10, 2018), <https://bit.ly/2qnlv1j>.

173. Taylor & Bailey, *supra* note 167.

(whole flower, vaporizers, oils, tinctures, etc.).¹⁷⁴ Today, “cannabis oil is popular,” but research on oil cannot be conducted “because the NIDA supply has not yet been trialed in humans . . . [and] the FDA will say it’s a ‘novel molecular entity’.”¹⁷⁵ Federal research constraints also make it “difficult for researchers who want to look at newer delivery systems”¹⁷⁶ including “so-called edibles that are eaten like snacks.”¹⁷⁷

2. Bureaucratic Hurdles

Investigators seeking to conduct marijuana research also encounter many bureaucratic and financial hurdles. Specifically, U.S. laboratories seeking to study cannabis

must navigate a series of review processes that may involve the National Institute on Drug Abuse (NIDA), the U.S. Food and Drug Administration (FDA), the U.S. Drug Enforcement Administration (DEA), institutional review boards, offices or departments in state government, state boards of medical examiners, the researcher’s home institution, and potential funders.¹⁷⁸

Funding is another common research barrier because “without adequate financial support, cannabis research will be unable to inform health care or public health practice or to keep pace with changes in cannabis policy and patterns of cannabis use.”¹⁷⁹

To date, NIDA scientists have conducted the majority of cannabis research, but federal allocation of research funds has the power to skew the direction of inquiry. For example, in 2015 “only 16.5 percent (\$10,923,472) of NIDA’s spending on cannabinoid research supported studies investigating therapeutic properties of cannabinoids”¹⁸⁰ with the remaining 83.5% allocated to risk assessment research. It is possible, but far from certain, that the current massive shift to greater legal medicinal and recreational marijuana use could eventually provide an increased evidence base of its effects provoking the federal government to remove current research obstacles. A more balanced investigatory approach by NIDA could yield a more comprehensive picture of potential health costs and benefits. However, given our current domestic policies, some of this new data may come from abroad.

174. John Hudak & Christine Stenglein, *AG Sessions Blocks Progress on Medical Cannabis Research*, BROOKINGS INST. (Oct. 25, 2017), <https://brook.gs/2S0oSYi>.

175. Wells, *supra* note 98.

176. *Id.*

177. Taylor & Bailey, *supra* note 167.

178. THE HEALTH EFFECTS OF CANNABIS, *supra* note 33, at 378–79.

179. *Id.* at 384.

180. *Id.*

3. Help from Abroad

Marijuana's Schedule I status only limits domestic research. Because marijuana proponents have not, and likely will not, advocate for removing marijuana from Schedule I, we may need to rely on research conducted in other countries to inform U.S. policymaking. For example, Canada has a national Centre on Substance Use and Addiction [CCSUA], which "was created by Parliament to provide national leadership to address substance use in Canada. . . . [and] produce guidance for decision makers by harnessing the power of research, curating knowledge and bringing together diverse perspectives."¹⁸¹

In August 2017, the CCSUA issued a *National Research Agenda on the Health Impacts of Non-Medical Cannabis Use*.¹⁸² This national research agenda "defines important areas for cannabis research and identifies priorities for those working in the field."¹⁸³ These steps include the following: (1) "identify[ing] current knowledge and research gaps related to the health effects of non-medical cannabis use;" (2) "identify[ing] existing data sources that can augment available data and knowledge in this area;" (3) "prioritiz[ing] the short-, medium- and long-term opportunities for research on the health effects of non-medical cannabis use;" and (4) discussing opportunities for collaboration among researchers and tangible next steps for moving forward with the research agenda."¹⁸⁴

In Spain, the Observatorio Español de Cannabis Medicinal (an organization of cannabis scientists) sponsors an annual conference.¹⁸⁵ During this conference, scientific research on topics including cancer and cannabis, pain and cannabis, and cannabis analytics were presented.¹⁸⁶

In the future, overseas labs may provide useful scientific research, but with marijuana consumption rates rising rapidly, U.S. researchers are at a significant disadvantage. Over the past half century, federal restrictions have ensured that "[c]linical research regarding the therapeutic benefits of cannabis ("marijuana") has been almost non-existent in the

181. *About CCSA*, CANADIAN CTR. ON SUBSTANCE ABUSE & ADDICTION, <http://www.ccdus.ca/Eng/About-CCSA/Pages/default.aspx> (last visited Mar. 18, 2019).

182. CANADIAN CTR. ON SUBSTANCE ABUSE & ADDICTION, NATIONAL RESEARCH AGENDA ON THE HEALTH IMPACTS OF NON-MEDICAL CANNABIS USE 1 (2017), <https://bit.ly/2Qs5X83> [hereinafter CCSA, RESEARCH AGENDA].

183. *National Research Agenda on Cannabis*, CANADIAN CTR. ON SUBSTANCE ABUSE & ADDICTION, <http://bit.ly/2PD0k5u> (last visited Mar. 18, 2019).

184. CCSA, RESEARCH AGENDA, *supra* note 182, at 3.

185. *See Ponencias*, OBSERVATORIO ESPAÑOL DE CANNABIS MEDICINAL, <http://oedcm.com/NUEVAWEBOEDCM/ponencias-2017/> (last visited Mar. 18, 2019) (Spain).

186. *Id.*

United States.”¹⁸⁷ As one epilepsy researcher summarized the global problem, people can easily buy and use a huge selection of marijuana products, but U.S. scientists cannot investigate “the safety, efficacy, and dosing of artisanal preparations available from dispensaries . . . and online sources.”¹⁸⁸ This can lead to absurd results. In one laboratory “[t]he DEA visited and determined that we had to do more to bolt down the locked freezer,” but it was “kind of comical, with all of these medical marijuana dispensaries scattered around town, sitting in my office and talking about everything we had to do to get a small amount of THC, cannabidiol, and cannabitol – 400 milligrams.”¹⁸⁹

4. The Federal Response

NIDA is well aware of researchers’ concerns. In response to a 2016 NIDA Request for Information, scientists across the country raised the following specific problems: (1) the lack of marijuana strains and products reflecting the diversity of products available in state dispensaries; (2) the lack of potency (i.e., marijuana with a higher THC content would better represent available products); (3) the small number and variety of marijuana chemotypes which precluded research into cannabinoids other than THC, terpenes, and flavonoids; (4) the lack of access to common marijuana strains (e.g., “those characterized as ‘indica’, ‘sativa’, and ‘hybrid’”); and (5) the poor quality of placebo marijuana, which “does not smell, taste, or look like regular marijuana and thus does not serve as an effective placebo.”¹⁹⁰ In an apparent response issued in August 2016, the DEA announced that it would expand its marijuana cultivation program to allow other growers to apply.¹⁹¹ But in November 2016 (after the DEA received 26 new site applications from potential pot growers), then U.S. Attorney General Jeff Sessions reversed course.¹⁹² To date, no additional marijuana cultivation sites have been federally approved.

187. Webb & Webb, *supra* note 56, at 109.

188. Brooke K. O’Connell et al., *Cannabinoids in Treatment-Resistant Epilepsy: A Review*, 70 *EPILEPSY & BEHAV.* 341, 341 (2017); *see also* Chen, *supra* note 156 (quoting Margaret Haney, a neurobiologist at Columbia University and cannabis researcher: “I would love to do a study comparing strains . . . I would love to directly compare but I’m unable to work with any marijuana on the street or in dispensaries.”).

189. Wells, *supra* note 98.

190. NIDA, *Summary of RFI*, *supra* note 65.

191. *See* Hudak & Stenglein, *supra* note 174.

192. *See id.* (opining that this decision was based solely on personal “ideological biases” and the Attorney General’s “absolute aversion” to all forms of marijuana, observing that the Attorney General’s views are inconsistent with the views of President Trump, and asking that the Attorney General “listen[] to the experts around him who understand the needs of the medical research community,” “get[] out of the way of the free conduct of medical research,” and “stop[] coming between patients and answers to important medical questions.”).

C. *What We Know So Far*

1. Recent Global Meta-Analyses

a. The National Academies of Sciences, Engineering, and Medicine

In 2017, the National Academies of Sciences, Engineering, and Medicine (“NASEM”) published a four hundred and sixty-eight page report entitled: *The Health Effects of Cannabis and Cannabinoids: The Current State of Evidence and Recommendations for Research*.¹⁹³ The NASEM report provides a meta-review of extant research into the health effects and health risks of cannabis and cannabis-derived products.¹⁹⁴ The NASEM conducted an extensive search of literature databases “giving primacy to recently published systematic reviews (since 2011) and high-quality primary research that studied 1 or more of 11 groups of health endpoints.”¹⁹⁵ The health “endpoints” explored by the NASEM included a comprehensive analysis of potential therapeutic effects for a variety of medical and mental health diseases and conditions.¹⁹⁶ The NASEM’s aggregation of health endpoints reflects the research conducted to date on marijuana’s claimed beneficial health effects.

Based on this literature review, the NASEM reached the following conclusions about marijuana’s treatment and palliative efficacy. Cannabis has the following potential therapeutic effects: (1) “in adults with chemotherapy-induced nausea and vomiting, oral cannabinoids are effective antiemetics;” (2) “[i]n adults with chronic pain, patients who were treated with cannabis or cannabinoids are more likely to experience a clinically significant reduction in pain symptoms;” (3) “[i]n adults with multiple sclerosis (MS)-related spasticity, short-term use of oral cannabinoids improves patient-reported spasticity symptoms.”¹⁹⁷ These studies suggest that marijuana may reduce specific symptoms currently treated by other medication.

With respect to cancer risks, the NASEM reached the following conclusions: (1) “smoking cannabis does not increase the risk for certain cancers (i.e., lung, head, and neck) in adults;” (2) cannabis use may be “associated with one subtype of testicular cancer;” and (3) “[t]here is minimal evidence that parental cannabis use during pregnancy is associated with greater cancer risk in offspring.”¹⁹⁸ These studies alone

193. THE HEALTH EFFECTS OF CANNABIS, *supra* note 33.

194. *See generally id.*

195. *Id.* at 31.

196. *Id.*

197. *Id.* at 85.

198. *Id.* at 141.

reveal very little about potential links between marijuana use and the full ranges of cancer risks and nothing about the dosage-response connection for any specific form of cancer.

The NASEM raised unequivocal concern about the impact of cannabis use on respiratory diseases (e.g. bronchitis, asthma, emphysema, pneumonia). With respect to respiratory diseases, there is scientific support for the following findings: (1) “[s]moking cannabis on a regular basis is associated with chronic cough and phlegm production;” (2) “[q]uitting cannabis smoking is likely to reduce chronic cough and phlegm production;” and (3) it is “unclear whether cannabis use is associated with COPD, asthma, or worsened lung function.”¹⁹⁹ These studies suggest that marijuana may pose health risks to those suffering from mild respiratory diseases, such as acute bronchitis, and to those suffering from chronic conditions, such as emphysema and lung cancer.

The NASEM also found scientific support for the following mental health risks and benefits: (1) “cannabis use is likely to increase the risk of developing schizophrenia and other psychoses;” (2) “in individuals with schizophrenia and other psychoses, a history of cannabis use may be linked to better performance on learning and memory tasks;” (3) “cannabis use does not appear to increase the likelihood of developing depression, anxiety, and posttraumatic stress disorder;” (4) “heavy cannabis users are more likely to report thoughts of suicide than nonusers;” and (5) “regular cannabis use is likely to increase the risk for developing social anxiety disorder.”²⁰⁰ Although clearly not definitive, the mental health research suggests the possibility of various psychological risks, including the risk of suicide, especially to users suffering from a preexisting mental health condition.

Finally, despite the ambitious scope of the NASEM study, its principal author candidly acknowledged that any conclusions must be understood in the context of the current evidence void. Despite massive increases in use, there is very little scientifically valid evidence to support marijuana and almost nothing is known about the efficacy, dose, administration, or side effects of commercially available marijuana products. The current dramatic increase in legal marijuana use could eventually provide an increased evidence base of pot’s effects that might help convince the federal government to lift research obstacles. For now, as principal author Dr. Donald Abrams explained, “barriers to conducting comprehensive research . . . mean patients and providers may lack treatment options and policymakers may lack a full evidence base

199. *Id.* at 181.

200. *Id.* at 289.

constitute[ing] a public health problem.”²⁰¹ So despite the massive new NASEM meta-analysis, we continue to know very little about marijuana’s claimed health benefits and even less about potential physical and mental health risks.

b. The World Health Organization

In 2017, the World Health Organization (“WHO”) issued its own report on the potential therapeutic uses and acute and chronic effects of cannabis and cannabinoid use.²⁰² With respect to the therapeutic uses of cannabinoids, the WHO reported that “[s]everal studies have demonstrated the therapeutic effects of cannabinoids for nausea and vomiting in the advanced stages of illnesses such as cancer and AIDS.”²⁰³ The WHO also noted other promising therapeutic uses including “treatment of asthma and glaucoma, as an antidepressant, appetite stimulant, anticonvulsant and anti-spasmodic, [although] research in this area should continue.”²⁰⁴ This research, like the NASEM report, suggests that cannabis and cannabinoids may have specific health benefits for conditions currently treated by other medications.

The WHO reported the following acute and chronic physiological and psychological effects. The developing research into acute effects includes evidence that: (1) “cannabis impairs cognitive development;” and (2) that “cannabis impairs psychomotor performance in a wide variety of tasks, such as motor coordination, divided attention, and operative tasks of many types.”²⁰⁵ The WHO also reported the following chronic physiological and psychological effects principally associated with heavy or long-term use: (1) “selective impairment of cognitive functioning which include the organization and integration of complex information involving various mechanisms of attention and memory processes;” (2) “development of a cannabis dependence syndrome characterized by a loss of control over cannabis;” (3) “exacerbate[ion] [of] schizophrenia in affected individuals;” (4) “epithelial injury of the trachea and major bronchi;” (5) “airway injury, lung inflammation, and impaired pulmonary defense against infection;” and (6) “a higher prevalence of symptoms of chronic bronchitis and a higher incidence of acute bronchitis.”²⁰⁶ This research echoes many of the findings of the NASEM report, but highlights

201. See Wells, *supra* note 98.

202. See WHO, *Cannabis*, *supra* note 63.

203. *Id.*

204. *Id.*

205. *Id.*

206. *Id.*

more specific cognitive functioning and memory concerns and addiction (cannabis dependency syndrome) risks.

On the specific question of fetal health, the WHO (unlike the NASEM) reported that cannabis used during pregnancy is “associated with impairment in fetal development leading to a reduction in birth weight” and “may lead to postnatal risk of rare forms of cancer although more research is needed in this area.”²⁰⁷ On the issue of the inadequacy of the extant data and its impact on the preliminary nature of any conclusions, the WHO report authors agreed with the authors of the NASEM study. According to the WHO authors, worldwide research is insufficient and, in particular, “the health consequences of cannabis use in developing countries are largely unknown because of limited and non-systematic research.”²⁰⁸

2. Marijuana and the Developing Brain

Most studies show that recreational marijuana use is more popular among teenagers and younger adults.²⁰⁹ Growing use among younger adults raises concerns about the potential effects of cannabis on the developing brain. Unfortunately, as with all other areas of nascent marijuana science, the neuroscience literature is inconclusive and contradictory. These problems are well illustrated by the few widely cited brain development studies.

A 2012 study found that regular cannabis use can be “associated with neuropsychological decline broadly across domains of functioning,” that regular users “reported noticing more cognitive problems,” and that “impairment was concentrated among adolescent-onset cannabis users, with more persistent use associated with greater decline.”²¹⁰ CBD has no recreational value. But like marijuana, new research suggests that CBD may have independent therapeutic potential. For example, there is recent “evidence that chronic pain, inflammation and insomnia are better relieved by cannabis high in cannabidiol (CBD).”²¹¹ However, there is also evidence that, without THC, CBD may not be as effective for some therapeutic purposes. For example, there is research suggesting that “[c]ancer-related nausea and poor appetite . . . are better relieved by cannabis high in THC, the psychotropic component of marijuana.”²¹² Although the data is very limited, this suggests that the interaction between

207. *Id.*

208. *Id.*

209. See THE HEALTH EFFECTS OF CANNABIS, *supra* note 33, at 61–63.

210. Madeline H. Meier et al., *Persistent Cannabis Users Show Neuropsychological Decline from Childhood to Midlife*, 40 PROCEEDINGS NAT’L ACAD. SCI. 2657, 2657 (2012).

211. *Id.*

212. Wells, *supra* note 98.

CBD and THC might impact therapeutic benefits and raises questions about the general medical value of the myriad CBD-only products currently available.

Recently, researchers began to explore the scientific therapeutic potential of both THC and CBD on epilepsy.²¹³ Early studies yielded inconclusive results, but numerous scientists believe that epilepsy research merits further targeted investigation, based in part on a long history of anecdotal reports of reduced symptomology by epileptic cannabis users.²¹⁴ More recent research suggests that CBD may be useful for epilepsy treatment and that it may also have more generalized neuroprotective effects.²¹⁵ In a clear endorsement of the quality of science in this specific field, in June of 2018, the FDA approved the first CBD-derived drug (Epidiolex) for the treatment of pediatric epilepsy.²¹⁶

CBD also showed early promise in the treatment of a range of neuropsychiatric disorders. In a decade-old animal study, CBD showed promise for the treatment of schizophrenia.²¹⁷ More recently, CBD has been shown to have potentially beneficial effects for a “range of neurodegenerative conditions and psychiatric disorders.”²¹⁸ These include the alleviation of symptoms for patients diagnosed with schizophrenia,²¹⁹ epilepsy,²²⁰ and multiple sclerosis.²²¹ In other recent research, CBD has been shown to have measurable anti-anxiety, antipsychotic, antiemetic and anti-inflammatory properties.²²² In a 2017 study, these promising neuroprotective effects were linked to CBD’s demonstrated antioxidant and anti-inflammatory activities.²²³ These studies suggest that CBD may

213. Orrin Devinsky et al., *Cannabidiol: Pharmacology and Potential Therapeutic Role in Epilepsy and Other Neuropsychiatric Disorders*, 55 *EPILEPSIA* 791 (2014).

214. Carmen Mannucci et al., *Neurological Aspects of Medical Use of Cannabidiol*, 16 *CNS & NEUROLOGICAL DISORDERS – DRUG TARGETS* 541, 543 (2017).

215. *Id.* at 543, 551.

216. *FDA Approves First Drug Comprised of an Active Ingredient Derived from Marijuana to Treat Rare, Severe Forms of Epilepsy*, *FOOD & DRUG ADMIN.* (June 25, 2018), <https://bit.ly/2AqKHMq>.

217. Raquel Levin et al., *Antipsychotic Profile of Cannabidiol and Rimonabant in an Animal Model of Emotional Context Processing in Schizophrenia*, 18 *CURRENT PHARMACEUTICAL DESIGN* 4960, 4961–62 (2012).

218. Alline C. Campos et al., *Cannabidiol, Neuroprotection and Neuropsychiatric Disorders*, 112 *PHARMACOLOGICAL RESEARCH* 119, 120 (2016).

219. Levin, *supra* note 217, at 4963.

220. Devinsky, *supra* note 213, at 800.

221. Thorsten Rudroff & Jacob Sosnoff, *Cannabidiol to Improve Mobility in People with Multiple Sclerosis*, *FRONTIERS IN NEUROLOGY* (Mar. 22, 2018), <https://doi.org/10.3389/fneur.2018.00183>.

222. See Mateus Machado Bergamaschi et al., *Safety and Side Effects of Cannabidiol, a Cannabis Sativa Constituent*, 6 *CURRENT DRUG SAFETY* 237, 237 (2011).

223. Mannucci, *supra* note 214, at 541; see also *What’s This About P-Glycoprotein?*, *TREATMENT ACTION GRP.* (July 2000), <http://www.treatmentactiongroup.org/tagline/2000/july/whats-about-p-glycoprotein>.

have a range of medical and palliative benefits creating the possibility that CBD might provide a non-psychoactive alternative to marijuana.

Despite the absence of THC, CBD has already been associated with various health risks. Recent CBD studies report “side effects, including inhibition of hepatic drug metabolism, alterations of in vitro cell viability, decreased fertilization capacity, and decreased activities of p-glycoprotein [a multidrug resistant protein that serves as a cell defense to harmful substances] and other drug transporters.”²²⁴ This study suggests that CBD may pose a risk of injury to the liver, impede fertility treatment, or interfere with proteins that help necessary transport within the body and cell protection from foreign substances.

In 2017, the WHO addressed comparative CBD and cannabis addiction risks.²²⁵ According to the WHO, “cannabidiol [CBD] is *not* [as] likely to be abused or create dependence as . . . other cannabinoids (such as Tetra Hydro Cannabinol (THC), for instance).”²²⁶ Based on this finding, the WHO concluded “[t]o date, there is no evidence of recreational use of CBD or any public health related problems associated with the use of pure CBD.”²²⁷ This finding may make sense, given CBD’s lack of THC, but because CBD remains subject to identical Schedule I restrictions – as “little is known about its safety and side effect profile in animals and humans,”²²⁸ as is known about cannabis.

E. *Physician Quasi-Acceptance*

According to a 2013 New England Journal of Medicine [NEJM] poll, 76% of doctors favor the legalization of medicinal marijuana.²²⁹ A 2018 Dana-Farber Cancer Institute study confirmed these findings within the oncological community.²³⁰ This study, which involved a random sampling of oncologists, noted widespread physician support and found that nearly 50% of oncologists actually recommended marijuana to their patients.²³¹ However, the 2018 study also revealed that most doctors who recommended marijuana also expressed concern that more and better research is needed.²³² Dr. Ilana Braun, M.D., a co-author of the Dana-

224. Bergamaschi et al., *supra* note 222, at 237.

225. See generally CANNABIDIOL (CBD) PRE-REVIEW REPORT, WORLD HEALTH ORGANIZATION [WHO] (39th Expert Committee on Drug Dependence, 2017), https://www.who.int/medicines/access/controlled-substances/5.2_CBD.pdf.

226. *Id.* (emphasis added).

227. *Id.*

228. See Bergamaschi et al., *supra* note 222, at 237.

229. Jonathan N. Adler & James A. Colbert, *Medicinal Use of Marijuana — Polling Results*, 368 NEW ENG. J. MED. 866, 866 (2013).

230. Braun et al., *supra* note 172.

231. *Id.*

232. *Id.*

Farber study, highlighted the fact that half of the “physicians would offer clinical advice about a topic on which they do not feel knowledgeable[,]” which demonstrates “the uncomfortable spot in which oncologists find themselves.”²³³ The large number of physicians now recommending pot helps to prove that the law is advancing much faster than the science.²³⁴ By 2018, medical marijuana was a legal cancer treatment in 30 states, yet according to Dr. Braun, even marijuana proponents are aware that “the scientific evidence base supporting use of medical marijuana in oncology remains thin.”²³⁵

Despite survey evidence indicating growing physician support, in practice, many doctors remain reluctant to prescribe or recommend cannabis—even in the 30 states where medical marijuana is legal.²³⁶ Recently, Dr. Orrin Devinsky, director of New York University’s Comprehensive Epilepsy Center and a prominent cannabidiol researcher, described current practice tensions as linked to marijuana’s bizarre legal status: “We have the federal government and the state governments driving a hundred miles an hour in the opposite direction when they should be coming together to obtain more scientific data.”²³⁷ To the extent that Dr. Devinsky is accurately characterizing physician opinion, the ongoing Schedule I status of cannabis and CBD remains a big impediment for mainstream medical acceptance.

Patients may also contribute to acceptance problems and to poor communication with their physicians. According to Dr. Peter Grinspoon of Massachusetts General Hospital: “Many patients find themselves in the situation of wanting to learn more about medical marijuana, but feel embarrassed to bring this up with their doctor. . . . Other patients are already using medical marijuana, but don’t know how to tell their doctors about this for fear of being chided or criticized.”²³⁸ To solve or alleviate these problems, Dr. Grinspoon offers the following suggestions: “My advice for doctors is that whether you are pro, neutral, or against medical marijuana, patients are embracing it, and although we don’t have rigorous studies and ‘gold standard’ proof of the benefits and risks of medical marijuana, we need to learn about it, be open-minded, and above all, be non-judgmental.”²³⁹ The advice that it is better for patients and physicians to speak candidly with each other is always true, although Dr. Grinspoon

233. *Id.*

234. *Id.*

235. *Id.*

236. Taylor & Bailey, *supra* note 167.

237. *Id.*

238. Peter Grinspoon, *Medical Marijuana*, HARV. MED. SCH. (Jan. 15, 2018, 10:30 AM), <https://bit.ly/2nGkT67>.

239. *Id.*

may be correct that marijuana's ongoing federal illegality raises specific concerns in the mind of both.

IV. THE LAW OF POT

A. *Federal-State Preemption*

If we begin at the beginning, Article VI of the U.S. Constitution provides that “the laws of the United States . . . shall be the supreme law of the land; . . . any Thing in the Constitution or Laws of any state to the Contrary notwithstanding.”²⁴⁰ In the two centuries since 1819, when *M’Culloch v. Maryland*²⁴¹ was decided, the Supremacy Clause has consistently been understood to mean that any state law found to conflict with a federal law governing the same activity is without effect.²⁴² More recently, the Supreme Court reified the state sovereignty debate by finding that Supremacy Clause questions must “start with the assumption that the historic police powers of the States [are] not to be superseded by [any] Federal Act unless that [is] the clear and manifest purpose of Congress.”²⁴³ Regardless of whether federal law or state law emerges triumphant, in all preemption analyses a determination of Congressional purpose must be the “ultimate touchstone.”²⁴⁴

Congressional intent may be the “touchstone” of preemption, but legislative purpose is not always readily apparent. In practice, preemption questions typically arise under two distinct circumstances. Relatively simple cases arise “[w]hen Congress legalizes a private activity that has been banned by the states, [making] the application of the Supremacy Clause . . . relatively straightforward.”²⁴⁵ Harder cases, like the marijuana example, arise “[w]hen Congress bans some activity that has been legalized by the states, . . . [because] both the legal status and practical import of state law are far less obvious.”²⁴⁶ Preemption questions can arise in the full range of criminal and civil contexts where federal and state jurisdiction overlaps including public health and safety, civil rights protections, and products liability. To help accommodate these different problems of statutory conflicts, the Supreme Court has delineated three types of federal-state preemption: (1) express (2) (implied) field, and (3) (implied) conflict.

240. U.S. CONST. art. VI, cl. 2.

241. *M’Culloch v. Maryland*, 17 U.S. 316 (1819).

242. *Id.* at 427.

243. *Rice v. Santa Fe Elevator Corp.*, 331 U.S. 218, 230 (1947).

244. *Retail Clerks Int’l Ass’n Local 1625 v. Schermerhorn*, 375 U.S. 96, 103 (1963).

245. Mikos, *supra* note 16, at 1422.

246. *Id.*

Easier cases typically involve express preemption. In these cases, a reviewing court must simply pinpoint the explicit congressional command.²⁴⁷ This will normally involve a specific judicial finding that Congress “declare[d] in express terms its intention to preclude local action in a given area.”²⁴⁸ In harder cases where there is no express congressional intent, field preemption can be implied. This will normally involve a finding that a state is “precluded from regulating conduct in a field that Congress has determined must be regulated by its exclusive governance.”²⁴⁹ However, field preemption requires a reviewing court to find a framework of federal regulation “so pervasive . . . that Congress left no room [in the field] for the States to supplement it”²⁵⁰ or a “federal interest . . . so dominant that the federal system will be assumed to preclude enforcement of state laws on the same subject.”²⁵¹ Finally, and equally challenging, conflict preemption may only be implied when “compliance with both federal and state regulations is a physical impossibility”²⁵² or if the challenged state law “stands as an obstacle to the accomplishment and execution of the full purposes and objectives of Congress.”²⁵³ Cases sometimes involve both implied field and implied conflict preemption. Under these circumstances, the Court has cautioned, even without evidence of a clear expression of legislative intent, preemption must still be “the clear and manifest [implied] purpose of Congress.”²⁵⁴

As more states legalize medicinal and recreational pot, the potential preemptive effect of the CSA has been a subject of growing academic attention. Professor Erwin Chemerinsky has opined that “marijuana regulation is one of the most important federalism conflicts in a generation.”²⁵⁵ In his view, the conflict between federal criminalization under the CSA and state legalization “raises questions of tension and cooperation between state and federal governments[,] . . . forces policymakers and courts to address the preemptive power of federal drug laws. . . . [and] create debilitating instability and uncertainty on the ground in those states that are pioneering new approaches to marijuana control.”²⁵⁶

247. *Id.*

248. *S.C. State Ports Auth. v. Jasper Cty.*, 629 S.E.2d 624, 628 (S.C. 2006).

249. *Arizona v. United States*, 567 U.S. 387, 399 (2012).

250. *Rice v. Santa Fe Elevator Corp.*, 331 U.S. 218, 230 (1947).

251. *Id.*

252. *Fla. Lime & Avocado Growers v. Paul*, 373 U.S. 132, 142–43 (1963).

253. *Arizona*, 567 U.S. at 399.

254. *Rice*, 331 U.S. at 230.

255. Chemerinsky et al., *supra* note 85, at 76.

256. *Id.* The federalism problems created by state legalization of marijuana are legion. Federally insured banks may decline to accept money from marijuana commerce because of the threat of money laundering prosecutions, leaving the businesses largely cash-only and cash-on-site. Marijuana dispensaries may not deduct

Other scholars disagree that marijuana's simultaneous illegality and legality is destabilizing. For example, Professor Ira Robbins recently argued that "conflicting federal and state marijuana laws can coexist" because "federalism allows states 'great latitude under their police powers to legislate as to the protection of the lives, limbs, health, comfort, and quiet of all persons.'"²⁵⁷ In Professor Robbins view, the theoretical tension has no practical import, because, in effect, "[a]ffording states broad authority promotes innovation and the potential for states to serve as smaller experimental vehicles for new ideas."²⁵⁸ Tension, in Professor Robbin's view, is not just unproblematic, it has social value.

To date, many of the marijuana legalization preemption questions have arisen in the context of employment law and the construction of the Americans with Disabilities Act ("ADA"). In these cases, federal courts typically find implied preemption because they

commonly hold that state marijuana laws are preempted by the CSA, that an employee's use of marijuana is not protected under the ADA, and that an employers' zero-tolerance (or similar) drug policy is an acceptable basis upon which to terminate a medical marijuana user's employment, rescind a job offer, or refuse to hire a candidate.²⁵⁹

To date, the Supreme Court has not addressed the preemptive effect of the CSA.²⁶⁰ If the federal decisions become more divided, this would create greater impetus for Supreme Court review.

The text of the CSA, which is fundamental to any preemption determination, reads as follows:

No provision of this subchapter shall be construed as indicating an intent on the part of the Congress to occupy the field in which that provision operates, including criminal penalties, to the exclusion of any State law on the same subject matter which would otherwise be

business expenses from federal taxes. Lawyers may encounter ethical dilemmas advising marijuana businesses because attorneys cannot knowingly assist clients in illegal conduct, even if that conduct is legal in state in which the lawyer practices or the client acts.

Jessica Berch, *Reefer Madness: How Non-Legalizing States Can Revamp Dram Shop Laws to Protect Themselves from Marijuana Spillover from Their Legalizing Neighbors*, 58 B.C. L. REV. 863, 970 (2017).

257. Ira P. Robbins, *Guns N' Ganja: How Federalism Criminalizes the Lawful Use of Marijuana*, 51 U.C. DAVIS L. REV. 1783, 1817 n.137 (2018) (quoting *Gonzales v. Oregon*, 546 U.S. 243, 270 (2006)).

258. *Id.*

259. Sara E. Payne & Geoffrey A. Mort, *Medical Marijuana in the Workplace*, N.Y. ST. BAR ASS'N J. (July 2018), https://www.nysba.org/Journal/2018/Jul/Medical_Marijuana_in_the_Workplace/.

260. *Id.* at 1442 ("The Supreme Court has never squarely addressed the [CSA] preemption issue, despite many claims to the contrary . . .").

within the authority of the State, unless there is a positive conflict between that provision of this subchapter and that State law so that the two cannot consistently stand together.²⁶¹

It is important to note that this statutory language omits both: (1) an express Congressional command; and (2) any text supporting an argument that Congress expressly manifested the intent to occupy the field. In fact, Congress clearly expressed its intent *not* to occupy that field.

This clear statutory language eliminates any plausible argument that the CSA creates express or implied field preemption, leaving open only the possibility of implied conflict preemption. At least one scholar has explained this congressional approach and its effect as follows:

Arguably, . . . the preemptive effect of the CSA is not as broad as congressional authority could have allowed. States remain free to pass laws relating to marijuana, or other controlled substances, so long as they do not create a “positive conflict” with federal law. In interpreting this provision, courts have generally established that a state medical marijuana law is in “positive conflict” with the CSA if it is “physically impossible” to comply with both the state and federal law, or where the state law “stands as an obstacle to the accomplishment and execution of the full purposes and objectives of Congress.”²⁶²

Thus, the only preemption question is whether, in jurisdictions where marijuana is now legal, it is physically impossible to comply with both state and federal law.

Using conflict preemption principles and general rules of statutory construction, Congress clearly intended only to “preempt any state law that positively conflicts with the CSA.”²⁶³ Future courts will need to decide whether state laws legalizing marijuana for medical and recreational use “create an impermissible ‘conflict’—as that term has been defined by the Supreme Court—with the CSA provisions prohibiting marijuana altogether.”²⁶⁴ Unsurprising, the Justices do not always agree about what is, and what is not, impossible.

The specific question of implied conflict preemption in the context of marijuana laws has recently attracted the attention of a various legal authors. Professor Sam Kamin is not especially worried about preemption challenges to state law because in his view “federal law clearly permits states to draft their own marijuana regulations, even if those regulations

261. 21 U.S.C. § 903 (2012 & Supp. 2017).

262. TODD GARVEY, CONG. RESEARCH SERV. R42398, MEDICAL MARIJUANA: THE SUPREMACY CLAUSE, FEDERALISM, AND THE INTERPLAY BETWEEN STATE AND FEDERAL LAWS 9 (2012).

263. Mikos, *supra* note 16, at 1451.

264. Chemerinsky et al., *supra* note 84, at 102.

fail to mirror the federal prohibition; the CSA explicitly disclaims any intention to occupy the field and preempt all inconsistent state laws.²⁶⁵ According to Professor Kamin, his analysis refutes the argument that serious federal criminal marijuana penalties preempt lighter (or non-existent) state law penalties for the same actions.²⁶⁶ In essence, Professor Kamin posits that a positive conflict is required (between state and federal law) and opines that a positive conflict does *not* arise when states simply liberalize or lift marijuana penalties, and would arise only in the implausible event that “the state were to *require* that which the federal government forbids that compliance with both state and federal law would become impossible.”²⁶⁷ Similarly, as Franklin Guenther, astutely observed in his recent law review comment, the CSA cannot preempt “state laws that simply *legalize* the use of marijuana.”²⁶⁸ Legalization alone does not inevitably create a positive conflict because state officers would not be responsible for enforcing federal law.²⁶⁹ Under this view, to avoid preemption problems a state must simply avoid drafting “state laws that attempt to promote the sale, distribution, or consumption of marijuana.”²⁷⁰

Unsurprisingly, state statutes legalizing marijuana do not include language promoting marijuana sale or use. This suggests a deliberate legislative effort to avoid “conflict[ing] directly with the proscriptions of . . . the CSA and thus becom[ing] an obstacle to its enforcement.”²⁷¹ Abjuring promotional language also precludes the possibility of creating additional complication in the event of a federal prosecution for aiding and abetting a federal crime.²⁷² More generally, it is one thing to establish that marijuana use is legal in your state and quite another to make it recommended.

Unresolved preemption questions are principally of interest to law professors. Without clear guidance from the Supreme Court, Professor Erwin Chemerinsky has offered a possible resolution in the form of a new theory of “cooperative federalism.”²⁷³ Cooperative federalism would not depend on finding an agreed-upon definition of a positive conflict, but

265. Sam Kamin, *Legal Cannabis in the U.S.: Not Whether but How?*, 50 U.C. DAVIS L. REV. 617, 624 (2018).

266. *Id.*

267. *Id.*

268. Franklin Guenther, *Pot, Printz, and Preemption: Why States Can “Just Say No” to Jeff Sessions and the Controlled Substances Act*, MINN. L. REV. DE NOVO (Apr. 26, 2017), <http://bit.ly/2zY1xPO>.

269. *Id.*

270. *Id.*; see also 21 U.S.C. § 856 (2012 & Supp. 2017); 18 U.S.C. § 2 (2012 & Supp. 2017).

271. Guenther, *supra* note 268.

272. See 18 U.S.C. § 2.

273. Chemerinsky et al., *supra* note 84, at 78.

would instead simply allow states seeking legalization to “opt out” of CSA marijuana provisions, assuming the states could meet specific eligibility criteria established by Congress or the DOJ.²⁷⁴ While Professor Chemerinsky appears to have devised an elegant solution, it is impossible to accurately predict the political traction or practical feasibility of his approach.

B. *The Supreme Court Weighs In*

1. Approving Federal Enforcement of the CSA

Over the past two decades, the Supreme Court has twice addressed the specific question of federal enforcement of the CSA. *United States v. Oakland Cannabis Buyers' Cooperative*,²⁷⁵ decided in 2001, involved a federal enforcement action under the CSA against Jeffrey Jones and the nonprofit Oakland Cannabis Buyers' Cooperative [OCBC] seeking to enjoin them from growing and distributing marijuana under California's Proposition 215.²⁷⁶ When Mr. Jones and the OCBC openly violated the injunction, the government initiated contempt proceedings and the defendants argued that the distributions of marijuana were “medically necessary.”²⁷⁷

The federal injunction had been granted by the district court; but when the case reached the Ninth Circuit, the court found the medical necessity defense legally cognizable.²⁷⁸ The appellate court reasoned that because the district court had “‘broad equitable discretion’ to fashion injunctive relief, that court could have, and should have, weighed the ‘public interest’ and considered factors such as the serious harm in depriving patients of marijuana.”²⁷⁹ On remand, the district court modified the injunction to include a medical necessity defense.²⁸⁰ Ultimately, the Supreme Court would disagree with the Ninth Circuit on a variety of grounds.

According to Justice Thomas, who wrote for the *Oakland Cannabis Buyers' Cooperative* majority, the question of a federal court's general authority to recognize a necessity defense (when such a defense is not specified by statute) has never been resolved.²⁸¹ However, the Court did

274. *Id.*

275. *United States v. Oakland Cannabis Buyers' Cooperative*, 532 U.S. 483 (2001).

276. *Id.* at 486–87.

277. *Id.*

278. *United States v. Oakland Cannabis Buyers' Coop.*, 190 F.3d 1109, 1114 (9th Cir. 1999), *rev'd*, 532 U.S. 483 (2001).

279. *Oakland Cannabis*, 532 U.S. at 488 (citing *Oakland Cannabis*, 190 F.3d at 1114).

280. *Id.* at 488–89.

281. *Id.* at 490.

not need to reach the broader jurisdictions issue to reject the specific medical necessity argument advanced in this case.²⁸² Justice Thomas explained the Court's reasoning as follows:

Under any conception of legal necessity, one principle is clear: The defense cannot succeed when the legislature itself has made a “determination of values.” In the case of the Controlled Substances Act, the statute reflects a determination that marijuana has no medical benefits worthy of an exception (outside the confines of a Government-approved research project). Whereas some other drugs can be dispensed and prescribed for medical use, [citation omitted] the same is not true for marijuana. Indeed, for purposes of the Controlled Substances Act, marijuana has “no currently accepted medical use” at all.²⁸³

Thus, in a case that arguably should have been about the science of marijuana, the Court relied on a three-decade old congressional finding (lacking any scientific support) to defeat a medical necessity claim (without considering any possible supporting scientific evidence).

In addition to illustrating the Court's disinclination to examine the scientific evidence, *Oakland Cannabis Buyers' Cooperative* also demonstrates the bizarre circular reasoning facilitated by marijuana's simultaneous federal illegality and state legality. Here is the tautology: the “Attorney General can include a drug in schedule I only if the drug ‘has no currently accepted medical use in treatment in the United States,’” therefore the Court must find that the drug has no medical use (making medical necessity impossible) because the Attorney General put the drug into Schedule I.²⁸⁴ The defects in this reasoning should be obvious. First, science had advanced by three decades since the CSA was enacted, so any medical conclusions from 1970 should be reevaluated. Second, as a matter of logic, this is akin to arguing that insulin, if placed on Schedule I, would cease to regulate diabetes. The Court's rote determination that cannabis has no potential medical purpose—because Congress said so three decades ago—is highly problematic as a matter of science, but as a matter of law it allowed the Court to evade the question of “medical necessity” and precluded the introduction of any new evidence to support the argument that marijuana has medical or palliative value.

Four years later, in *Gonzales v. Raich*,²⁸⁵ the Supreme Court upheld enforcement of the CSA against California medical marijuana producers on different grounds—as a proper exercise of Congressional Commerce

282. *Id.* at 491.

283. *Id.* at 491.

284. *Id.* at 492.

285. *Gonzales v. Raich*, 545 U.S. 1 (2005).

Clause power.²⁸⁶ Like *Oakland Cannabis Buyers' Cooperative*, *Raich* arose after state and federal law enforcement officers had raided plaintiffs' home and DEA agents had seized and destroyed plaintiffs' marijuana plants because they were grown in violation of the CSA.²⁸⁷ The *Raich* Court specifically rejected the plaintiffs' argument that the seized marijuana was being used solely "for personal medical purposes on the advice of a physician;" ruling instead that Congress has the authority to designate marijuana "as contraband for any purpose."²⁸⁸

On the question of medicinal use, the Court again avoided the scientific merits and simply echoed the circular reasoning of *Oakland Cannabis Buyers' Cooperative*, holding that such use was impossible because "Congress expressly found that the drug has no acceptable medical uses."²⁸⁹ As with the earlier case, the judicial determination that cannabis has no possible medical use because Congress said so almost four decades earlier, made any plaintiffs' evidence of marijuana's therapeutic value irrelevant to the determination.

The *Raich* Court's Commerce Clause analysis was as problematic as its evaluation of the evidence. The seized marijuana had been grown, sold, and used solely in California.²⁹⁰ All of the materials necessary for its cultivation had also been carefully purchased within the state. Based on these facts, the plaintiffs argued that the CSA's "categorical prohibition," as applied here to the wholly "intrastate manufacture and possession of marijuana for medical purposes," exceeded Congress's authority to regulate interstate commerce.²⁹¹

The *Raich* Court began its analysis by reviewing the three modern forms of Commerce Clause authority:

First, Congress can regulate the channels of interstate commerce. Second, Congress has authority to regulate and protect the instrumentalities of interstate commerce, and persons or things in interstate commerce. Third, Congress has the power to regulate activities that substantially affect interstate commerce [citations omitted].²⁹²

286. *Id.* at 28 ("[T]he mere fact that marijuana—like virtually every other controlled substance regulated by the CSA—is used for medicinal purposes cannot possibly serve to distinguish it from the core activities regulated by the CSA.").

287. *Id.* at 7.

288. *Id.* at 26–27.

289. *Id.* at 27.

290. *Id.* at 15.

291. *Id.*

292. *Id.* at 16.

The Court quickly concluded that only the third “substantial effect” category could be implicated by plaintiffs’ actions.²⁹³ Thus, the question for the Court was whether Congress has the “power to regulate purely local activities that are part of an economic class of activities that have a substantial effect on interstate commerce.”²⁹⁴

Quoting *Wickard v. Filburn*,²⁹⁵ the *Raich* Court observed that “even if appellee’s activity be local and though it may not be regarded as commerce, it may still, whatever its nature, be reached by Congress if it exerts a substantial economic effect on interstate commerce.”²⁹⁶ Ignoring both the real-world and analytic distinctions between the congressional regulation of national wheat prices, at issue in *Wickard*, and the intrastate cultivation and home use of small amounts of marijuana for personal medicinal purposes, the Court found that the inevitable diversion of marijuana into the national market would affect interstate commerce.²⁹⁷ The *Raich* decision seemed to ignore the basic facts and to rest, at least partly, on the Court’s use of a four-decade-old Webster’s dictionary definition of “economic” that included the “production of goods.”²⁹⁸ More notably, the Court simply ignored the critical requirement of proof of a “substantial” economic impact.²⁹⁹ Justice Scalia, who wrote for the majority, made no effort to quantify the economic impact of the activities at issue simply said “[w]e have never required Congress to legislate with scientific exactitude.”³⁰⁰ *Raich* suggests that the Court will effectively presume, despite all apparent evidence to the contrary, that certain activities will have some effect on interstate commerce.

2. Critique of the Modern Approach to Commerce Clause Authority

The *Raich* decision has been soundly criticized as an unconstitutional expansion of Commerce Clause authority. It has also been specifically cited as evidence of the Rehnquist Court’s federalism inconsistency and

293. *Id.* at 17.

294. *Id.*

295. *Wickard v. Filburn*, 317 U.S. 111 (1942).

296. *Raich*, 545 U.S. at 17 (quoting *Wickard*, 317 U.S. at 125).

297. *Id.* at 19 (noting that the inevitable “diversion of homegrown marijuana” would “frustrate the federal interest in eliminating commercial transactions in the interstate market in their entirety”).

298. *Id.* at 25.

299. *See* U.S. v. Lopez, 514 U.S. 549, 559 (finding that under the Commerce Clause, “the proper test requires an analysis of whether the regulated activity ‘substantially affects’ interstate commerce.”).

300. *Id.* at 17.

of the Court's growing politicization.

Despite its billing as the protector of states' rights, the [*Raich*] Court gave almost as expansive an account of federal power under the Commerce Clause as could be imagined. In order to sustain the claimed federal interest, the Court had to find that, as applied, the CSA was a valid exercise of the federal legislative power, notwithstanding the lack of engagement of the home-grown marijuana with any economic markets, intrastate or interstate.³⁰¹

Writing in dissent in *Raich*, Justice O'Connor, argued that the decision had improperly expanded federal powers to intrude into intrastate concerns and to the detriment of other governmental interests. In her opinion, one of federalism's "chief virtues" is the promotion of innovation.³⁰² Innovation occurs because "a single courageous State may, if its citizens choose, serve as a laboratory; and try novel social and economic experiments without risk to the rest of the country."³⁰³ According to Justice O'Connor, *Raich* exemplified the virtue of state innovation, but the Court had applied the CSA to "extinguish[] that experiment, without any proof that the personal cultivation, possession, and use of marijuana for medicinal purposes, if economic activity in the first place, has a substantial effect on interstate commerce and is therefore an appropriate subject of federal regulation."³⁰⁴ *Raich* was also a complete departure from the fundamental federalism principles articulated in just ten years earlier in *United States v. Lopez*.³⁰⁵

A similar critique has been advanced by various legal scholars. Shortly after *Raich* was decided, Professor Thomas Merrill opined that the decision signaled the Court's "ill-advised" federalism shift away from clear rules and towards prohibitory limitations.³⁰⁶ In 1955, in *United States v. Lopez*,³⁰⁷ the Court had upheld a federal "Gun-Free School Zones Act," based on a finding that the possession of a gun in school has no impact on interstate commerce.³⁰⁸ According to Professor Merrill, Justice O'Connor's discussion of *Lopez* was intended to serve as a reminder that Congressional ability to regulate intrastate commerce is strictly limited to those activities that have a "substantial effect on interstate commerce [and]

301. Samuel Issacharoff & Catherine M. Sharkey, *Backdoor Federalization*, 53 UCLA L. REV. 1353, 1362 (2006).

302. *Raich*, 545 U.S. at 42 (O'Connor, J., dissenting).

303. *Id.*

304. *Id.* at 43.

305. *United States v. Lopez*, 514 U.S. 549 (1995).

306. Thomas W. Merrill, *Rescuing Federalism After Raich: The Case for Clear Statement Rules*, 9 LEWIS & CLARK L. REV. 823, 826 (2005)

307. *United States v. Lopez*, 514 U.S. 549 (1995).

308. *Id.* at 567.

only if that activity is ‘economic’ in nature.”³⁰⁹ In Professor Merrill’s opinion, in *Raich* makes it “difficult to see how growing and consuming marijuana at home for medicinal purposes is ‘economic’ activity,” which should have placed it “beyond the power of Congress to regulate under *Lopez*.”³¹⁰ But in his view, after *Raich*, “*Lopez*’s prohibitory rule was watered down to the point where it may have little continuing significance.”³¹¹ Both Justice O’Connor and Professor Merrill would apparently agree that the same Commerce Clause powers the Court strictly when a state sought to ban gun possession in school was inexplicably expanded when an individual sought, in accordance with state law, to grow and use medical marijuana in his home.

Since *Raich*, the Supreme Court has avoided the marijuana debate. Most notably, in 2016, the Court declined by a vote of 6-2 (with Justices Thomas and Alito dissenting), a challenge by Nebraska and Oklahoma to Colorado’s recreational use law.³¹² Nebraska and Oklahoma had alleged that the new Colorado law violated federal drug laws and “increased trafficking and transportation of Colorado-sourced marijuana into their territories, requiring them to expend significant law enforcement, judicial system, and penal system resource to combat the increased trafficking and transportation of marijuana.”³¹³

The Court’s 2016 decision declining to hear *Nebraska v. Colorado*³¹⁴ was viewed as a victory by marijuana legalization proponents. According to Tom Angell, chairman of Marijuana Majority, “[t]here’s no question about it: This is good news for legalization supporters. This case, if it went forward and the Court ruled the wrong way, had the potential to roll back many of the gains our movement has achieved to date.”³¹⁵

C. *The Tenth Amendment*

1. The Anti-Commandeering Doctrine

The Tenth Amendment provides that the “powers not delegated to the United States by the Constitution, nor prohibited by it to the States, are reserved to the States respectively, or to the people.”³¹⁶ In *Raich*, the Court clarified that the Commerce Clause provides Congress with the authority

309. Merrill, *supra* note 306, at 826.

310. *Id.*

311. *Id.*

312. John Ingold, *Supreme Court denies Oklahoma and Nebraska challenge to Colorado pot*, DENVER POST (Mar. 21, 2016, 2:34 AM), <https://dpo.st/2Lh1kf3>.

313. *Nebraska v. Colorado*, 136 S. Ct. 1034, 1036 (Thomas, J., dissenting).

314. *Id.*

315. Ingold, *supra* note 312.

316. U.S. CONST. amend. X.

to regulate marijuana. Although the *Raich* Court's Commerce Clause decision was clear with respect to the Congressional authority question, any effort at federal enforcement of the CSA raises independent and complicated Tenth Amendment concerns.

Federal enforcement of the CSA against the states would implicate the Tenth Amendment's "anti-commandeering doctrine." The anti-commandeering doctrine bars the federal government from forcing states to enact laws or forcing states to assist the federal government in enforcing federal law within a state.³¹⁷ The "anti-commandeering" doctrine, as described by the Court in 1997 in *Printz v. United States*,³¹⁸ bars Congress from imposing duties on state or local government officials including law enforcement. In *Printz*, another case involving gun control legislation, the Court refused to require state and local officials to comply with federal legislation requiring background checks on prospective handgun buyers.³¹⁹ With *Printz* a notable exception, the anti-commandeering doctrine has traditionally been of little practical import. Congress has rarely attempted to commandeer state officials, and the Court has rarely relied on this doctrine to strike down a federal statute.³²⁰

The anti-commandeering doctrine could play a greater future role in cases where state and federal marijuana laws conflict. This doctrine, which supports a strict divide between federal and state control, could help impede any future CSA enforcement efforts "because it essentially tells the federal government that it is on its own when it comes to enforcing its own drug laws."³²¹ While the federal government might continue to successfully argue that marijuana is illegal under the CSA, its illegal status may be of little practical import, because "state and local officials cannot be forced to arrest or charge anyone with a violation of the CSA."³²² In effect, the anti-commandeering doctrine makes it very unlikely that, in states where marijuana is now legal, state law enforcement would ever play a role in enforcing federal law.

In a very interesting new article, Professor Sam Kamim speculated that the Court's May 2018 anti-commandeering decision in *Murphy v. NCAA*,³²³ striking down a federal law that had prohibited states from legalizing sports gambling, has significant implications for the future of marijuana legalization.³²⁴ According to Professor Kamin, the *Murphy*

317. See *Printz v. United States*, 521 U.S. 898, 912 (1997).

318. *Printz v. United States*, 521 U.S. 898 (1997).

319. See *id.* at 912.

320. Andrew B. Coan, *Commandeering, Coercion, and the Deep Structure of American Federalism*, 95 B.U. L. REV. 1, 8–9 (2015).

321. Guenther, *supra* note 268.

322. *Id.*

323. *Murphy v. Nat'l College Athletics Ass'n*, 138 S. Ct. 1461 (2018).

324. *Id.* at 1484–85.

decision portends that “the federal government cannot prohibit states from implementing marijuana law reform. Just as it cannot force the states to enforce the federal marijuana prohibition, it cannot require them to keep their own prohibitions in place, or force states that have regulated and taxed marijuana to undo such laws.”³²⁵ If Professor Kamin is correct that *Murphy* has paved the way for states to make individualized marijuana decisions, this would be welcome news for legalization proponents.

Of course, the anti-commandeering doctrine does not prevent the federal government from using federal law enforcement officers to enforce the CSA. Although the Constitution cannot prevent federal law enforcement, robust enforcement is highly unlikely because it would be impracticable. As more states “implement laissez-faire statutes toward marijuana consumption and distribution, the Justice Department will have to allocate more of its own resources toward the investigation, prosecution, and imprisonment of the hundreds of thousands of marijuana offenders arrested and charged each year.”³²⁶ This scenario is improbable because the “federal government lacks the resources needed to enforce its own ban vigorously: although it commands a \$2 trillion dollar (plus) budget.”³²⁷ In practice, “the federal government is only a two-bit player when it comes to marijuana enforcement. . . . [with] [o]nly 1 percent of the roughly 800,000 marijuana cases generated every year . . . handled by federal authorities.”³²⁸ Given the economic realities, the largest impediment to federal enforcement of the CSA is not deference to the states or a change of heart about criminality, but federal inability to manage massive additional policing costs.

2. Congressional Spending Power

Congress also has spending power (i.e., the power of the purse), which it can use to steer the enforcement of federal law by state law enforcement. In effect, Congress has the inherent power to shape state public policy “by enacting spending legislation aimed at inducing states to adopt certain approaches to public health problems.”³²⁹ However, congressional spending power has well-established limits.

National Federation of Independent Business v. Sebelius,³³⁰ the 2012 landmark case upholding the constitutionality of the Patient Protection and

325. Sam Kamin, *Murphy v. NCAA: It's About Much More Than Gambling on Sports*, THE HILL (May 15, 2018, 8:00 AM), <http://bit.ly/2SLdZth>.

326. Guenther, *supra* note 268.

327. Mikos, *supra* note 16, at 1424 (2009).

328. *Id.*

329. Sara Rosenbaum, *Gonzales v. Raich: Implications for Public Health Policy*, 120 PUB. HEALTH REPS. 680, 682 (2005).

330. *Nat'l Fed'n of Indep. Bus. v. Sebelius*, 567 U.S. 519 (2012).

Affordable Care Act (ACA or “Obamacare”), would likely govern any future congressional spending power inquiry. In relevant part, the Supreme Court held that the Congress could not compel states to expand Medicaid by threatening to withhold funding for existing state Medicaid programs.³³¹ The Court reasoned that this exercise of federal spending power would violate constitutional separation of powers.³³² According to the Court, Spending Clause legislation cannot be used to undermine the sovereign power of the individual states.³³³ Although *Sebelius* provides a recent unequivocal delineation of spending power limits, the case rests on earlier spending power cases, in which the Court held that the separation of powers previous decisions holding that Congress cannot use its spending power authority to demand that states “govern according to Congress’ instructions.”³³⁴

In sum, although Congress could try to use its spending authority to restrict funds to state that fail to recriminalize marijuana, this strategy might be unconstitutional. The *Sebelius* Court recently held that Congress’s coercive use of its conditional spending power raises constitutional concerns similar to those implicated under the Tenth Amendment anti-commandeering doctrine.³³⁵ As Professor Mikos predicted, conditional federal spending would likely be viewed as a congressional effort to “sidestep jurisprudential limits on its authority and accomplish otherwise impermissible objectives.”³³⁶ Conditional spending power is viewed with skepticism as one of “federalism’s Trojan Horses.”³³⁷ The risk, in the marijuana context, is that any Congressional effort to incentivize the recriminalization of marijuana would be an effort to supplant the legislative authority and judgment of duly elected state officials and voters.

V. CONCLUSION: POT’S UNCERTAIN POLITICAL FUTURE

A. *Recent Executive Branch Shifts*

Although the status of marijuana as a Schedule I drug has been constant for the past half-century, the modern history of federal

331. *Id.* at 585.

332. *Id.* at 588.

333. *Id.*

334. *New York v. United States*, 505 U.S. 144, 162 (1992).

335. *Nat’l Fed’n of Indep. Bus. v. Sebelius*, 567 U.S. 519, 588 (2012).

336. Mikos, *supra* note 16, at 1461.

337. *Id.*

enforcement policy has been wildly inconsistent.

The United States Justice Department under the Clinton Administration took the position that the CSA did not apply to Schedule I drugs such as marijuana in states with medical use laws. However, the Bush Administration adopted a contrary position that, state law notwithstanding, any personal possession of marijuana, even for medical reasons and without any evidence of sale or commercial purposes, amounted to a criminal violation of the CSA. In effect, the Bush Administration eliminated its predecessor's medical use exception.³³⁸

In 2009, in response to growing tension between state decriminalization efforts and marijuana's Schedule I status, the Deputy Attorney General David Ogden issued a policy memorandum, which attempted to resolve this conflict (the "Ogden Memo").³³⁹

The Ogden Memo reiterated that "the Department of Justice is committed to the enforcement of the Controlled Substances Act in all States[,] [that] Congress has determined that marijuana is a dangerous drug, and [that] the illegal distribution and sale of marijuana is a serious crime and provides a significant source of revenue to large-scale criminal enterprises, gangs, and cartels."³⁴⁰ However, in an effort to "mak[e] efficient and rational use of its limited investigative and prosecutorial resources," the federal prosecution of "significant traffickers of illegal drugs, including marijuana, and the disruption of illegal drug manufacturing and trafficking networks [would] continue to be a core priority."³⁴¹ But federal resources would no longer be directed to the investigation and prosecution of any "individuals whose actions are in clear and unambiguous compliance with existing state laws providing for the medical use of marijuana."³⁴² The Ogden Memo drew a firm distinction between drug trafficking and distribution and person medical use as permitted by state law.

The following policy statement from then Attorney General Eric Holder accompanied the release of the Ogden Memo:

It will not be a priority to use federal resources to prosecute patients with serious illnesses or their caregivers who are complying with state laws on medical marijuana, but we will not tolerate drug traffickers

338. Rosenbaum, *supra* note 329, at 680.

339. U.S. Deputy Att'y Gen., Memorandum on Investigations and Prosecutions in States Authorizing the Medical Use of Marijuana (Oct. 19, 2009), <http://bit.ly/2rCHLFi>.

340. *Id.*

341. *Id.*

342. *Id.*

who hide behind claims of compliance with state law to mask activities that are clearly illegal.³⁴³

At the time of the Ogden Memo, the DEA website included the following warning: “Smoked marijuana has not withstood the rigors of science — it is not medicine and it is not safe. [But the DEA] targets criminals engaged in cultivation and trafficking, not the sick and dying.”³⁴⁴ Years earlier, on August 29, 2013, then U.S. Deputy Attorney General James M. Cole had released a memo announcing that the Department of Justice would not allocate any resources to efforts to overturn marijuana legalization under state law.³⁴⁵

The transition from the Obama administration to the Trump administration has been accompanied by many policy changes. On January 4, 2018, then Attorney General Jeff Sessions rescinded the Ogden Memo and reversed the five-year-old Obama policy³⁴⁶ of non-interference with states that have decriminalized or legalized marijuana use.³⁴⁷ By 2018, more than half of the states had decriminalized medical marijuana, and at that time eight states also allowed the possession of small amounts of marijuana for recreational use.³⁴⁸ The Trump administration’s announcement came just three days after the legalization of recreational marijuana in California following a decade of widely available medical marijuana throughout the state.³⁴⁹

The Trump administration announcement was a reversal, not just of Obama’s policy, but also of candidate Trump’s specific campaign pledge

343. David Stout and Solomon Moore, *U.S. Won’t Prosecute in States That Allow Medical Marijuana*, N.Y. TIMES (Oct. 19, 2009), <https://nyti.ms/2EwmLbr>.

344. *Id.*

345. U.S. Deputy Att’y Gen., Memorandum on Guidance Regarding Marijuana Enforcement (Aug. 29, 2013), <https://www.justice.gov/iso/opa/resources/3052013829132756857467.pdf>.

346. *See id.*

347. *See* Laura Jarrett, *Sessions nixes Obama-era rules leaving states alone that legalize pot*, CNN (Jan. 4, 2018, 5:44 PM), <https://cnn.it/2LiQ1TU>.

348. *See* Chemerinsky et al., *supra* note 84, at 85–89.

349. *See* Jarrett, *supra* note 347. Currently, you can purchase marijuana for recreational use in Alaska, Colorado, the District of Columbia, Maine, Massachusetts, Michigan, Nevada, Oregon, Vermont, and Washington. *See Map of Marijuana Legality by State*, DISA, <https://disa.com/map-of-marijuana-legality-by-state> (last updated Jan. 2019). A close vote in Maine, which necessitated the hand counting of individual ballots, resulted in a January 2017 decision legalizing recreational use. *See* Gillian Graham, *Recreational marijuana is now legal in Maine. Here’s what you need to know*, PORTLAND PRESS HERALD (Jan. 30, 2017), <https://bit.ly/2DteAMz>. However, Maine’s then-Governor, Paul LePage, voiced his opposition a YouTube video predicting that marijuana use would lead to heroin addiction, would occur next to schools, daycare centers, and churches, and finally that pot would now be smoked and sold at Maine’s state fairs. *See* Real High End Glass for Sale, *Maine’s Governor LePage on Question 1*, YOUTUBE (Oct. 16, 2016), <https://www.youtube.com/watch?v=Dg9wHovN5FI&feature=youtu.be>.

to leave marijuana-related decisions to the states.³⁵⁰ It is also worth noting that one month later, Sessions released a memo on private prisons reversing the Obama Administration's plan to phase out private prisons.³⁵¹ To the extent that the Obama-era marijuana policy was intended to help reduce incarcerations for minor marijuana possession offenses, the Trump administration's rescission of this policy would have the opposite effect creating a crop of new inmates and more profits for private prisons and their owners.³⁵²

Recent Trump administration decisions are not only inconsistent with campaign promises, but they do not reflect public opinion as shown by recent political polling data. Currently, 71% of U.S. voters do not approve of federal government intervention into state decisions decriminalizing marijuana.³⁵³ Current DOJ policy is consistent with Session's longstanding personal antipathy towards pot. Before serving as Attorney General, Sessions was widely-quoted as saying that "good people don't smoke marijuana."³⁵⁴ While serving as Attorney General, Sessions had sent a letter to Congress warning that state marijuana legalization spawns the growth of black markets and increases interstate marijuana commerce.³⁵⁵ Finally, in what sounds too much like *Breaking Bad*-induced confusion, Sessions also blamed marijuana legalization for causing numerous deadly lab explosions.³⁵⁶ Although it is impossible to accurately predict whether the new Trump policies will result in more prosecutions and incarcerations, by disrupting the Obama era détente they will exacerbate tensions between federal and state law and enforcement objectives.

B. Recent Federal Legislative Initiatives

1. The Marijuana Justice Act (2017)

A few months before Sessions rescinded the Ogden Memo, Senator Cory Booker waded into the public debate by introducing the Marijuana Justice Act of 2017.³⁵⁷ This multi-purpose law offers a radically different

350. See Chris Nichols, *TRUE: During campaign, Trump pledged to leave marijuana legalization up to states*, POLITIFACT (Feb. 28, 2017, 6:00 AM), <https://bit.ly/2lv5Ton>.

351. See Jon Schuppe, *Private Prisons: Here's Why Sessions' Memo Matters*, NBC NEWS (Feb. 26, 2017, 5:23 AM), <https://nbcnews.to/2LgaY1C>.

352. *Id.*

353. See Nichols, *supra* note 350.

354. See German Lopez, *The Trump administration's new war on marijuana, explained*, VOX (Jan. 5, 2018, 10:35 AM), <https://bit.ly/2E9antJ>.

355. See Letter from Jeff Sessions, U.S. Att'y Gen., to Jay Inslee, Wash. Governor, and Robert Ferguson, Wash. Att'y Gen. (July 24, 2017), <https://bit.ly/2JPoXuv>.

356. *Id.*

357. See Marijuana Justice Act of 2017, S. 1689, 115th Cong. (2017).

approach to the same federal vs. state conflict, because Senator Booker's proposal would fully legalize marijuana at the federal level.³⁵⁸

In addition to eliminating legal and enforcement inconsistencies, Senator Booker is specifically focused on broader social justice objectives. The Marijuana Justice Act seeks to reduce or eliminate the disparate socio-economic, racial, and ethnic impact of marijuana arrests and prosecutions. The Act, would "incentivize states through federal funds to change their marijuana laws if those laws were shown to have a disproportionate effect on low-income individuals and/or people of color."³⁵⁹ The Marijuana Justice Act would involve conditional federal spending and its future remains uncertain, but its explicit social justice goals would likely received some congressional support.

2. The VA Medicinal Cannabis Research Act (2018)

On May 8, 2018, a House committee approved cannabis legislation that would encourage the U.S. Department of Veterans Affairs (the "V.A.") to conduct research on marijuana's medical benefits.³⁶⁰ Specifically, the VA Medicinal Cannabis Research Act of 2018 would allow and support research relating to the safety and efficacy of marijuana to treat veterans diagnosed with chronic pain, post-traumatic stress disorder, and other conditions.³⁶¹ According to the American Legion, which is a congressionally chartered Veteran Service Organization, as of October 2017, over 90% of all veterans surveyed support medical cannabis research and over 80% of veterans also support legalizing medical marijuana.³⁶² The American Legion also reported that over 22% of veterans already use cannabis to treat some type of medical condition.³⁶³

358. *Id.*

359. See Press Release, Sen. Cory Booker, Booker Introduces Landmark Bill to End the Federal Prohibition on Marijuana (Aug. 1, 2017), <https://bit.ly/2f6g18M>. Senator Booker stated:

Arrests for marijuana now account for more than half of all drug arrests in the U.S., and black Americans too often bear the brunt of these misguided laws. Blacks are nearly four times as likely to be arrested for marijuana possession as whites are, despite the fact that there's no difference in marijuana use between the two groups.

Id.

360. See *Committees: H.R.5520 — 115th Congress (2017-2018)*, CONGRESS.GOV, <https://www.congress.gov/bill/115th-congress/house-bill/5520/committees> (last visited Mar. 18, 2019).

361. See VA Medicinal Cannabis Research Act of 2018, H.R. 5520, 115th Cong. (2018).

362. See CHAIRMAN PHIL ROE, H. COMM. ON VETERANS' AFFAIRS, BACKGROUND TO H.R. 5520: THE VETERANS AFFAIRS MEDICINAL CANNABIS RESEARCH ACT OF 2018 (2018).

363. *Id.*

However, the legislative fate of the VA Medicinal Cannabis Research Act of 2018 may be irrelevant. In a surprising decision, on July 25, 2018, the V.A. announced that it would not recommend or even study the use of medical marijuana to treat veterans.³⁶⁴ The public response was immediate. The New York Times responded in an op-ed by citing “a disconnect in care”³⁶⁵ by the Veteran’s Administration. According to the Times’ editors, the V.A. “has funded lots of marijuana studies, but not of therapeutic potential. All the work has been related to problems of use.”³⁶⁶ A V.A. spokesman, who failed to address the substantive concern that abuse merited attention but medical potential did not, simply stated that the bill did not change marijuana’s current Schedule I status.³⁶⁷

Current VA policy is an abrupt shift away from the position espoused by Dr. David J. Shulkin, the Trump Administration’s first Secretary of Veterans Affairs. Dr. Shulkin had specifically recommended that “the tangle of red tape surrounding Schedule 1 drug studies” be reduced to facilitate cannabis research.³⁶⁸ According to Dr. Shulkin, medical marijuana could be especially important to veterans: “We have an opioid crisis, a mental health crisis, and we have limited options with how to address them, so we should be looking at everything possible.”³⁶⁹ To date, the V.A. has not publicly explained the reason for this abrupt shift in policy or its complete disinterest in exploring marijuana’s potential therapeutic benefits for the community it serves.

C. *Confounding Political Factors*

1. The Opioid Crisis

The opioid addition crisis further complicates marijuana policy. The recent increases in both medicinal and recreational cannabis use had been attributed (at least in part) to growing awareness of the significant health risks of opioid abuse and addiction.³⁷⁰

364. See Dave Philipps, *V.A. Shuns Medical Marijuana, Leaving Vets to Improvise*, N.Y. TIMES (July 25, 2018), <https://www.nytimes.com/2018/07/25/us/marijuana-veterans.html>.

365. *Id.*

366. *Id.*

367. *Id.*

368. *Id.*

369. *Id.*

370. See Kevin Murphy, *New York Points the Way in Dealing with Opioid Crisis*, FORBES (Aug. 2, 2018), <https://www.forbes.com/sites/kevinmurphy/2018/08/02/new-york-points-the-way-in-dealing-with-opioid-crisis/#5e7bf4628f62> (discussing how New York State’s Department of Health has begun to prescribe medical marijuana as an opioid replacement).

The extant data on any possible link between marijuana and opioid use is inconclusive. The evidence may eventually establish a worrisome association between marijuana use and opioid use or it may prove that marijuana is a helpful and effective substitute for opioids for some palliative purposes and/or that marijuana can be used to limit opioid reliance.

Recent research suggests that marijuana may form one part of an opioid crisis solution. In a study presented at the May 2018 meeting of the American Geriatrics Society, medical marijuana was linked to effective efforts to curb the opioid overuse—especially for older patients living with chronic pain from osteoarthritis, spinal stenosis, or pain from hip and knee joints that could not be replaced.³⁷¹ Dr. Diana Martins-Welch, a co-author of the study, stated: “What I’m seeing in my practice, and what I’m hearing from other providers who are participating in medical marijuana programs, is that their patients are using less opioids.”³⁷² If others can replicate these findings, it would incentivize future research into marijuana substitution for opioid users.

But policymakers, voters, and consumers should not misconstrue a public push to replace opioids with cannabis as evidence that cannabis is benign or has no addiction risks. Currently, “public perception surrounding the use of medicinal cannabis suggests that this plant-based therapy is viewed as not much different than a botanical drug product or supplement used for health or relief of symptoms if disease persists.”³⁷³ Marijuana is demonstrably safer than opioids; there has never been a reported death from a marijuana overdose.³⁷⁴ However, as shown above, the data on marijuana and addiction is incomplete and inconclusive, and its long- and short-term physiological and psychological effects are virtually unknown. Given the paucity of the scientific evidence, any assumption that cannabis must be healthy because it is a botanical, is ridiculously naive.

2. Scientific Illiteracy, “Truthiness,” and Empirical Relativism

Good marijuana law must be based on good marijuana science. But our 50 years commitment to maintaining marijuana as a Schedule I substance has guaranteed that the stagnant science cannot keep pace with

371. See Northwell Health’s Feinstein Inst. for Med. Res., *Survey: Medical marijuana could reduce opioid use in older adults*, MED. XPRESS (May 1, 2018), <https://medicalxpress.com/news/2018-04-survey-medical-marijuana-opioid-older.html>.

372. *Id.*

373. Bridgeman et al., *supra* note 50, at 181.

374. See Elli Silverman, *The Truth Behind the ‘First Marijuana Overdose Death’ Headlines*, WASH. POST (Nov. 17, 2017), <https://wapo.st/2DRqFu8>.

the changing law. But, as with all other twenty-first century science and law problems, the lack of evidence is not the only impediment to clear thinking and sound public policy.

Pro-legalization state legislators seeking new revenue streams have little interest in demanding more scientific data that could reveal the risks of marijuana. Their constituents are similarly disinclined to advocate for more research. When voters support or oppose legalization, they are unlikely advocates for better research because we are an increasingly scientifically illiterate population that simply fails to recognize the unknown information we actually need. Americans have a shocking and increasing unfamiliarity with fundamental scientific facts and methods including the relationship between the earth and sun, and cannot answer basic questions about earth's history including when humans ever rode dinosaurs.³⁷⁵ Our scientific ignorance becomes more problematic when combined with a growing disinclination to question our own beliefs and instant Internet access to unreliable confirmatory information. As these sociological factors work together, they are "dramatically reshaping our relationship to the world of knowledge"³⁷⁶ by "unmoor[ing] information from the context required to understand it."³⁷⁷ Once considered inarguable fact, scientific information is increasingly dismissed as mere opinion.

This relativistic approach to science-based questions raises important concerns. The philosopher Susan Haack has predicted:

As science progresses, it tends to get more expensive; in part because many, if not most, of the easily- and cheaply-obtainable results have been obtained already, and in part, because, as the work becomes more complex, it also becomes more costly As scientific work becomes more expensive, it must rely more and more on governments and large industrial concerns for support; and these, obviously, are apt to give priority to quite other values than the epistemological norms at the heart of the scientific enterprise.³⁷⁸

In the similarly prescient words of Stephen Colbert:

Truthiness is tearing apart our country, and I don't mean the argument over who came up with the word. I don't know whether it's a new thing, but it's certainly a current thing, in that it doesn't seem to matter what facts are. It used to be, everyone was entitled to their own

375. See SCIENCE DAILY, *supra* note 73.

376. MNOOKIN, *supra* note 74, at 5–8 (describing the promulgation of the increasingly popular and dangerous myth that MMR vaccines cause autism).

377. *Id.*

378. See Haack, *supra* note 76, at 15.

opinion, but not their own facts. But that's not the case anymore. Facts matter not at all. Perception is everything.³⁷⁹

A value-laden or “truthiness” approach to scientific inquiry cannot produce valid evidence, except by chance.

In the marijuana context, legalization proponents may appeal to a scientifically ignorant voting public, by touting marijuana as a medical cure-all or a safe alternative to opioids or alcohol. Voters unsophisticated about the rigor of scientific research and testing will simply assume they have adequate information. Under these circumstances, the impetus for better scientific information can only come from the scientific community. American scientists hamstrung by marijuana's Schedule I status and unable to compete with foreign counterparts have made no headway on this problem for the past fifty years. It is possible, but far from certain, that the current massive shift to greater marijuana use will provide increased evidence of its effects and provoking the federal government to remove current research obstacles.

I have written elsewhere about the harm that courts cause policy makers and the public when they engage in extralegal judicial decision-making without predicate empirical evidence.³⁸⁰ In the marijuana context, future decision maker (judges, lawmakers, voters, and consumers) who seek accurate information about marijuana's benefits and risks online or from unreliable media sources will almost invariably be misinformed. In the context of mainstream “respectable” media, there is a ubiquitous tendency to present a “balanced” view on virtually every question of natural or social science.³⁸¹ In many contexts, this balance falsely suggests an empirical equivalence—even when the evidence for one side is overwhelming (e.g., natural selection, global warming, childhood vaccine safety). For example, the physiological and psychological risks of marijuana use, especially regular use by adolescents may be significant and its benefits uncertain. These concerns are not in equipoise. As decision makers consider marijuana, the mainstream media is not the only problem. Although we typically turn to medical and scientific published for valid evidence, a shocking number of medical and scientific articles are published without critical information, including authors' conflicts of

379. Nathan Rabin, *Interview: Stephen Colbert*, A.V. CLUB (Jan. 25, 2006, 1:26 PM), <http://www.avclub.com/article/stephen-colbert-13970>.

380. See generally Joelle A. Moreno, *Extralegal Supreme Court Policymaking*, 24 WM. & MARY BILL RTS. J. 451 (2015).

381. See Katrina vanden Heuvel, *The distorting reality of 'false balance' in the media*, WASH. POST (July 15, 2014), <https://wapo.st/1opwv8e> (describing the problem of “[f]alse equivalence in the media [and] giving equal weight to unsupported or even discredited claims for the sake of appearing impartial . . .”).

interests.³⁸² Thus, sources of information can educate or contribute to confusion and bad decisions.

Finally, the future of evidence-based marijuana decision making is threatened by the problems that arise based on incomplete information. All science-based law and policy questions require that decision makers accept or reject arguments about causation. Dr. Frank C. Keil, Director of the Yale Cognition and Development Lab, has found that decisions about causation based on incomplete information can be especially problematic because “[p]eople of all ages tend to be miscalibrated with respect to their explanatory understandings; that is, they think they understand in far more detail than they really do how some aspect of the world works or why some pattern in the world exists.”³⁸³ In order “[t]o assess how well people deal with causal complexity . . . one must first know when one is in over one’s head.”³⁸⁴ Marijuana decision makers operating without an extant base of valid scientific evidence will need better methods “of sensing when there are gaps in one’s knowledge that make one’s understanding so flawed that it is inadequate for use in a task.”³⁸⁵ Like the problems that arise when decisions about science are made by the scientifically ignorant, this involves the near-impossible tasks of recognizing deficits in information and understanding.

Although not a panacea, decision-making research from behavioral economics could prove helpful. Professor Brendan Nyhan of Dartmouth College has examined the impact of providing accurate scientific information to parents deciding whether to vaccinate their children.³⁸⁶ Professor Nyhan’s research showed that parents with mixed or negative feelings toward vaccines who were provided with accurate information about medical benefits and risks paradoxically “became *less* likely to say they would vaccinate a future child after receiving information debunking the myth that vaccines cause autism.”³⁸⁷ Given the obstacles to developing a more accurate and comprehensive scientific data on marijuana’s physiological and psychological effects, Professor Nyhan’s research suggests that the evidence is not enough. To facilitate the development

382. See Curtis Brainard, *Mixed Grades for Medical Coverage*, COLUM. JOURNALISM REV. (Apr. 22, 2011), http://www.cjr.org/the_observatory/mixed_grades_for_med_coverage.php?page=all.

383. Frank C. Keil, *Explanation and Understanding*, 57 ANN. REV. PSYCHOL. 227, 242 (2006).

384. Frank C. Keil, *Getting to the Truth: Grounding Incomplete Knowledge*, 73 BROOK. L. REV. 1035, 1037 (2008).

385. *Id.*

386. See generally Brendan Nyhan et al., *Effective Messages in Vaccine Promotion: A Randomized Trial*, 133 PEDIATRICS 835 (2014).

387. Brendan Nyhan, *Vaccine Opponents Can Be Immune to Education*, N.Y. TIMES (May 8, 2014), <https://nyti.ms/2Dd06zF> (emphasis added).

science-based public policy, presentation of future data (or data from overseas) must be accompanied by information designed to accommodate conscious and unconscious emotional reactions to marijuana use as a medicine or palliative, or for recreation. If marijuana is not removed from Schedule I, marijuana research will likely only proceed in narrow areas of research reflecting public health priorities. The best example is the June 2018 FDA approval of the CBD-derived drug (Epidiolex) to treat pediatric epilepsy.³⁸⁸

The current rush towards state marijuana legalization raises interesting and vital new science-based legal questions and resulting policy decisions will redound beyond the pot-smoking/vaping/eating electorate. As with every science-based social question, our “democratic society depends on the ability of its members to make rational choices [and] [i]f we can’t tell the difference between reasonable and unreasonable claims, we become susceptible to the claims of charlatans, scoundrels, and mountebanks.”³⁸⁹ As a 2017 Harvard/National Science Foundation study recently warned, if Americans continue to approach new empirical questions with “[m]isperceptions about the scientific and political world,” as a 2017 Harvard/National Science Foundation study recently warned, these questions will aggregate and “pose a fundamental threat to democracy, undermining citizens’ ability to make decisions that effectively promote both individual self-interest and the social good.”³⁹⁰ The rapid legalization of medical and recreational marijuana does not end the science-law debate. Instead it is the first step in a decision chain implicating the reach of national drug policy, the depth of state sovereignty, and how we will fulfill our shared obligation to ensure the health and safety of our citizenry.

388. See FOOD & DRUG ADMIN., *supra* note 216; see also Wells, *supra* note 98.

389. Hodayun Sidky, *The War on Science, Anti-Intellectualism, and ‘Alternative Ways of Knowing’ in 21st-Century America*, SKEPTICAL INQUIRER, Apr. 2018, at 38, 38.

390. R. Kelly Garrett & Brian E. Weeks, *Epistemic beliefs’ role in promoting misperceptions and conspiracist ideation*, PLOS ONE, Sept. 18, 2017, at 1, 1.