



Emerging

# Drug Trends Report

July 2019 | Shedding new light on America's No. 1 public health problem

## Clearing Away the Confusion: Marijuana is not a Public Health Solution to the Addiction Crisis

### Overview

With more than 70,200 deaths occurring in 2017, the public health crisis of fatal drug overdoses is headline news and shows no signs of abating (National Institute on Drug Abuse, 2019). Beneath this alarming statistic are also tens of millions of individuals and their loved ones who *live* every day with addiction. Expanding access to naloxone to help prevent opioid overdose deaths in the short term is critical, but we cannot let short-term solutions overshadow or replace the need to provide high-quality treatment services to individuals with all forms of addiction to stem the tide of future overdose cases. Individuals with opioid use disorder usually use other substances: cocaine and benzodiazepines figure prominently in overdose deaths, for example. Another fast-growing concern is methamphetamine use. Of course, alcohol remains ever-present as well and is part of the picture for the vast majority of people who suffer from addiction. As previously discussed in the *Emerging Drug Trends Report* "Widening the Lens on the Opioid Crisis," a continuum of approaches to identify high-risk individuals and intervene appropriately is needed to make progress.

Recently, some advocates have claimed that marijuana might be part of the solution to the opioid crisis. Within the past year, states such as New York and Illinois have passed legislation making medical marijuana more accessible to individuals with opioid prescriptions (Illinois General Assembly, 2018; New York State Department of Health, 2018). However, clinical evidence produced from rigorous research methodology that marijuana is an effective treatment for pain or opioid use disorder does not exist; therefore, marijuana should not be promoted as a safe alternative (Humphreys & Saitz, 2019). The notion that increased access to marijuana will help the country shed its current addiction crisis does not have scientific merit, and distracts from planning and implementing a longer-term and broader set of evidence-based strategies. A recent study by Chen et al. (2019) reaffirmed the urgency of implementing a multifaceted approach involving prevention, treatment and harm reduction to address the opioid overdose crisis. The annual number of overdose deaths is expected to increase by nearly 150% between 2015 and 2025.

This report clarifies the current state of scientific understanding on the relationship between marijuana and opioid use. While more research is needed to fully comprehend the complex issues discussed, and to develop new interventions and treatments for addiction, decades of existing research findings should serve as the foundation of policy decisions.

## State-level correlations between marijuana policies and opioid medication prescribing

A recent study examined data for Medicare Part D recipients living in all 50 states. The authors investigated whether prescribing patterns for opioids were different based on the state's marijuana policies. Bradford and colleagues (2018) specifically measured the total number of daily doses for any opioid medication prescribed to a person from 2010 through 2015. States with any type of medical marijuana law had an estimated 2.1 million fewer daily doses of opioid prescriptions per year than states without a medical marijuana law (the average among all states was 23.1 million daily doses). States with medical marijuana dispensaries and those that allow home cultivation were estimated to have 14.4% and 6.9% fewer, respectively, daily doses of opioids prescribed. Although it is tempting to speculate that the lower prescribing was due to marijuana policies, the study results cannot conclude that differences in marijuana policies were the reason for the different opioid prescribing rates. There could have been several other reasons for the state-level differences in opioid prescribing rates besides the marijuana laws that were in place at the time the data were examined.

Medicare Part D is an optional prescription drug benefit plan available to Medicare recipients in the U.S. More than 70% of Medicare recipients are enrolled in Medicare Part D.

Wen and Hockenberry (2018) examined opioid prescribing patterns among Medicaid recipients living in the eight states that implemented medical marijuana laws between 2011 and 2016. In four of the eight states, statistically significant reductions in opioid prescribing rates were found during this period. Of the four states that implemented recreational marijuana laws, three also experienced significant reductions in opioid prescribing rates. Just as in the study described above, however, this study cannot determine that the decrease in opioid prescribing was due to differences in the marijuana laws. It must also be noted that the results

from these studies (Bradford et al., 2018; Wen & Hockenberry, 2018) were observed among specific groups of individuals: Medicare and Medicaid recipients. The researchers cannot say if state-level reductions in opioid prescribing have been or will be observed among the general public in states with marijuana laws. Caution is warranted when considering whether to use these findings when making policy decisions about access to marijuana that will affect the general public.

## State-level correlations between marijuana policies and opioid overdoses

Bachhuber and colleagues (2014) compared opioid overdose death rates, rather than prescribing patterns, in states with and without marijuana legalization. Between 1999 and 2010, the opioid-related death rate rose in all states, but states with a medical marijuana law had higher rates of opioid-related mortality than states without such a law. However, when the influence of medical marijuana policies was isolated from the influence of the state and year in which the data were collected, the researchers found that states with a medical marijuana law had an estimated 24.8% fewer opioid overdoses per year on average compared with states that had no medical marijuana law. A more recent study (Shover, Davis, Gordon, & Humphreys, in press) refutes the findings of Bachhuber (2014). Using essentially the same approach but extending the time of analysis through 2017, the newer study found that the direction of the association reversed—states enacting a medical marijuana law experienced a 22.7% increase in opioid overdoses. When Shover and colleagues (in press) applied additional statistical controls that were not part of the earlier study, they found no association between the two variables. This more recent study seriously calls into question the claim that medical marijuana laws have any beneficial impact on opioid overdose death rates and suggests instead that such laws could potentially have a negative impact.

## Beware of the “ecological fallacy”

The most important consideration when evaluating the studies cited earlier is that they were all conducted at the state level. Ecological studies like these, which utilize measurements of health that have been averaged across a population, are often valuable first steps in identifying a possible relationship between an exposure and some outcome—in this case, marijuana policies and opioid prescribing rates or overdose deaths. However, studies conducted at the state level cannot and should not be used to draw conclusions about individual behaviors; such conclusions are known in public health science as “ecological fallacies.”

For example, if you compared volunteering across multiple schools, you would discover that some schools have a higher proportion than others of students who volunteer in their community. Yet the reason for volunteering might not have anything to do with school policies or school environments. Rather, the choice to volunteer might stem from many other influences, such as home life, work schedules or personal interests. Similarly, it would be an ecological fallacy to assume that because opioid prescribing or overdose deaths decreased among states with legal marijuana policies, individuals in those states reduced their opioid use because of increased availability of marijuana.

## Studies at the individual level: Marijuana use increases risk for subsequent opioid use and dependence

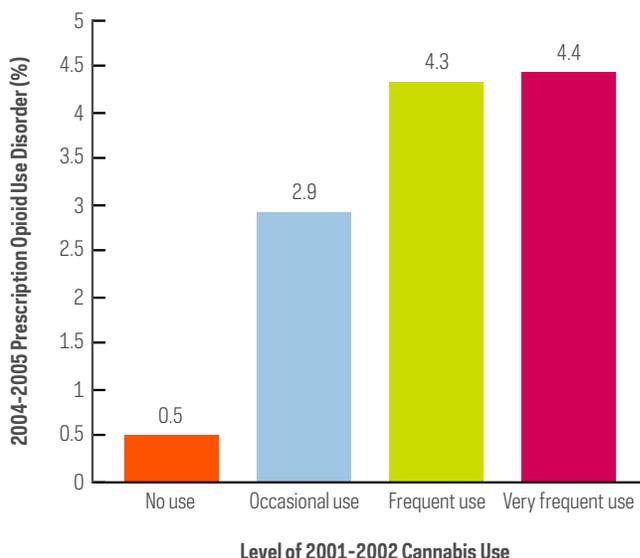
The other side to the story regarding marijuana and opioids is how the two substances are related to each other at the individual level. The vast majority of individuals who misuse prescription pain medication and/or heroin initiated their drug use early in their teens, usually beginning with alcohol and marijuana. Biologically, early initiation of drug use primes the brain for enhanced responses to other drugs later in life. Most recently, Caputi and Humphreys (2018) show the heightened risk of prescription opioid misuse among medical marijuana users. Using nationally representative data, they found that medical marijuana users have twice the risk for prescription opioid misuse compared with non-users of medical marijuana. Although this study used data collected at one

point in time, the findings raise doubts that medical marijuana can be protective against the development of opioid use disorder.

Similarly, Olfson and colleagues (2018) analyzed a different nationally representative dataset from two time periods—2001 to 2002 and 2004 to 2005. Individuals who used marijuana from 2001 to 2002 had nearly three times the odds of starting to use opioids nonmedically three years later compared with their counterparts who did not use marijuana (after adjusting for demographic factors and other substance use history). Increased risk for beginning to use opioids nonmedically was observed among a subset of adults with moderate to severe pain as well.

Opioid use disorder is the clinical diagnosis used to identify whether or not use of pain relief medication or heroin causes an individual significant impairment, including health problems, physical withdrawal, persistent or increasing use, and failure to satisfy

**Figure 1.** Level of 2001-2002 Cannabis Use and Incident 2004-2005 Prescription Opioid Use Disorder in the National Epidemiological Survey on Alcohol and Related Conditions (NESARC); (Olfson, Wall, Liu, & Blanco, 2018)



responsibilities at work, school or home (Substance Abuse and Mental Health Services Administration, 2017). In Olfson et al. (2018), marijuana use was associated with two times the odds of developing opioid use disorder within three years, compared with those who did not use marijuana. Figure 1 shows that the proportion of individuals who developed opioid use disorder by 2004 to 2005 increased as 2001 to 2002 frequency of marijuana use increased.

Another study utilizing several years of data also observed that marijuana use increases risk for subsequent nonmedical use of opioids. Fiellin et al. (2013) examined the association between marijuana use and subsequent misuse of prescription opioids among young adults 18 to 25 years old using nationally representative data from 2006 to 2008. More than one-third of young adults who misused opioids had already initiated marijuana use in their lifetime prior to prescription opioid misuse. Young adults who had previously used marijuana had 2.5 times the odds of starting to misuse prescription opioids compared with those who had not used marijuana. The risk posed by previous marijuana use was about twice the risk from using other common substances, such as alcohol and cigarettes (1.2 and 1.3 times the odds, respectively). A recent study by Butelman et al. (2018) underscored young adulthood as a critical developmental period for intervention as individuals with opioid dependence started their heaviest use of marijuana at 19 years old on average.

## Substituting one drug for another has implications

Some authors of ecological studies examining the relationship between marijuana use and opioid prescribing rates have argued that more liberalized marijuana laws might help combat the current opioid epidemic by allowing individuals to manage their pain with marijuana rather than prescription opioids. However, these studies do not determine if successful pain treatment replacement is actually occurring. To our knowledge, the majority of studies of this nature conducted so far have utilized online questionnaires at one time point to ask individuals who already used marijuana—medically and nonmedically—about their opioid use and substitution practice (Boehnke, Litinas, & Clauw, 2016; Corroon, Mischley, & Sexton, 2017; Reiman, Welty, & Solomon, 2017; Sexton et al. 2016). These studies have shown that marijuana is being used to manage pain regardless of legalization laws; unfortunately, weak methodology prevents more substantive conclusions about the efficacy of replacing prescription opioid use with marijuana use. Longitudinal studies with longer-term data collection that could provide a clearer picture of the benefits and harms of pain management substitution have not yet been conducted.

Perhaps the methodologically strongest study that attempts to determine whether or not marijuana use for pain treatment improves patient outcomes is “The Pain and Opioids in Treatment” study (Campbell et al., 2018). Campbell et al. recruited 1,514 participants from pharmacies across Australia with non-cancer pain who were prescribed opioids between 2012 and 2014, and then followed up with them four years later. By the end of the study, 24% of the participants had also used marijuana for pain management and 60% had interest in using marijuana for pain (compared with 33% who had interest at the beginning of the study). Participants who used marijuana for pain had greater pain severity, reported that pain interfered with life more and had greater generalized anxiety disorder compared with their peers who did not use marijuana. Importantly, the research team did not find any relationship between marijuana use for pain and actual pain severity as time progressed. The study concluded that marijuana use did not reduce an individual’s prescriptions for opioids or increase opioid discontinuation. While this study was conducted in Australia, and therefore cannot be directly generalized to the United States due to differences in marijuana use policies, this study offers the strongest evidence to date that at the individual level, marijuana use for pain does not decrease opioid use or improve pain outcomes.

As described earlier, several studies assessing risk for opioid use conducted at the individual level have found that those who use marijuana are more likely to start misusing prescription opioids and developing opioid use disorder compared with those who do not use marijuana (Fiellin et al., 2013; Olfson et al., 2018). Individuals with chronic pain who use marijuana are also not immune from the increased risk for starting to misuse prescription opioids, a finding that further calls into question the claim that increased medical marijuana use would reduce opioid misuse and overdose (Olfson et al., 2018).

## Conclusions

- The claim that increased access to marijuana through legalization policies could help combat the opioid crisis must be viewed with skepticism. These ideas were never directly tested but were derived from ecological studies comparing prescribing rates and overdose rates at a state level. From ecological studies, there is no way to attribute prescribing patterns and overdoses to the laws and not to other factors. The most recent replication of these earlier ecological studies utilizing data that extended through 2017 did not find any evidence that medical marijuana laws were associated with a decrease in opioid overdose mortality. Some analyses from the replication study actually suggested that comprehensive medical marijuana laws were associated with increases in overdose deaths.
- Studies using strong scientific methods show that marijuana use increases the risk for starting to misuse prescription opioids, rather than lowering the risk. Moreover, individuals with addiction to prescription opioids often have a history of using other drugs, including marijuana, and therefore need comprehensive addiction intervention and treatment.
- Marijuana use to manage pain does not appear to be related to decreases in pain, and evidence that marijuana is an effective treatment for opioid use disorder is even weaker (Humphreys & Saitz, 2019).
- Experts predict that the opioid overdose crisis will worsen in the coming decade. As a result, there is a need for novel, multipronged interventions in order to change the epidemic's trajectory.
- When dealing with the addiction and overdose crisis facing the U.S., policymakers should make decisions that have a strong scientific justification.

Making marijuana more available might appear to be a solution to the current drug crisis in our nation. However, a more critical look at the research evidence suggests just the opposite. Decades of research findings have shown that marijuana use puts an individual at heightened risk for misuse of prescription opioids, heroin and other drugs.

## Insights and Perspectives

### **Marvin D. Seppala, MD, Chief Medical Officer, Hazelden Betty Ford Foundation**

- “We need to study cannabis and its derivatives (i.e., CBD) to determine which health conditions could benefit and how such products would work. As important, we need to determine the limitations—what cannabis and its derivatives do not affect or help. We’ve jumped the gun and allowed relatively indiscriminate use by a large portion of the population without adequate scientific study.”

### **George Dawson, MD, Psychiatrist, Hazelden Betty Ford Foundation**

- “The commercially driven political aspects of medical cannabis are undeniable. The legalization of cannabis for recreational purposes had no traction with American politicians or voters until it was promoted as a miracle drug. Due to that widespread promotion, medical cannabis is now legal in 33 states, and recreational cannabis is legal in 10. The legalization arguments have also suggested that the U.S. was behind other countries of the world despite the fact only two countries—Canada and Uruguay—have completely legalized cannabis for medical and recreational sale and purchase. In fact, only 22 of 195 countries have legalized medical cannabis, with widely varying restrictions on its use. The Netherlands is often cited as an example of recreational cannabis legalization, but most Americans don’t realize that cannabis is illegal for recreational use in most places there, with use and sale allowed only in specially licensed coffee shops. The promotion of cannabis as a solution to the opioid overuse and chronic pain problems can be seen as an extension of the commercially driven political arguments for legalization that outpace any science to back them up.

“At the scientific level, areas of research in the epigenetics of cannabis smoke and how that may predispose people to substance use problems has been left out of the debate. The neurobiological mechanisms of how cannabis can modify the underlying brain substrate at various developmental stages is currently an area of active research. Many such studies focus on the issue of whether cannabis-induced epigenetic changes predispose to the development of opioid use disorders.”

### **Kate Gliske, PhD, Research Scientist, Butler Center for Research, Hazelden Betty Ford Foundation**

- “These studies, and others like them, highlight an increasing trend across the U.S. and worldwide to minimize the harm associated with marijuana use. This is particularly problematic given the substantial evidence of marijuana’s harmful effects on mental health disorders, pregnancy outcomes and brain functioning (see Memedovich et al., 2018 for review) among a significant minority of the population. Very little research currently exists about the relationship between marijuana legalization and its effects on the opioid crisis, and what is available presents a conflicted picture of its effectiveness. We are still years away from understanding the full effect of current marijuana legalization policies on opioid use, and it would be rash to base further policy decisions on so little data.”

### **Stephen Delisi, MD, Medical Director, Professional Education Solutions, Hazelden Betty Ford Foundation**

- “All aspects of the debate around medical cannabis for chronic pain and opioid use disorder point to the dire need for a deliberate, thoughtful and science-driven approach. Medical providers, payers, patients, governmental agencies and the general public should demand that science and research guide decision-making and policies around this issue.”

### **Nick Motu, Vice President and Chief External Affairs Officer, Hazelden Betty Ford Foundation**

- “The dialogue around cannabis legalization has been muddied by the federal government’s neglect of this issue and the desperate desire for solutions to the nation’s opioid crisis. It is time for Congress and the Administration to course-correct in a responsible, necessary and politically viable way—by having the science drive the policy to protect the health and well-being of Americans.”

## References

- Bachhuber, M. A., Saloner, B., Cunningham, C. O., & Barry, C. L. (2014). Medical cannabis laws and opioid analgesic overdose mortality in the United States, 1999-2010. *JAMA Internal Medicine*, 174(10), 1668-1673. doi:10.1001/jamainternmed.2014.4005
- Boehnke, K. F., Litinas, E., & Clauw, D. J. (2016). Medical cannabis use is associated with decreased opiate medication use in a retrospective cross-sectional survey of patients with chronic pain. *Journal of Pain*, 17(6), 739-744. doi:10.1016/j.jpain.2016.03.002
- Bradford, A. C., Bradford, W.D., Abraham, A., & Bagwell Adams, G. (2018). Association between U.S. state medical cannabis laws and opioid prescribing in the Medicare Part D population. *JAMA Internal Medicine*, 178(5), 667-672. doi:10.1001/jamainternmed.2018.0266
- Butelman, E. R., Maremmanni, A. G. I., Bacciardi, S., Chen, C. Y., Correa da Rosa, J., & Kreek, M. J. (2018). Non-medical cannabis self-exposure as a dimensional predictor of opioid dependence diagnosis: A propensity score matched analysis. *Frontiers in Psychiatry*, 9, 283. doi:10.3389/fpsyt.2018.00283
- Campbell, G., Hall, W. D., Peacock, A., Lintzeris, N., Bruno, R., Larance, B., Nielsen, S., Cohen, M., Chan, G., Mattick, R. P., Blyth, F., Shanahan, M., Dobbins, T., Farrell, M., & Degenhardt, L. (2018). Effect of cannabis use in people with chronic non-cancer pain prescribed opioids: Findings from a 4-year prospective cohort study. *Lancet Public Health*, 3(7), e341-e350. doi:10.1016/S2468-2667(18)30110-5
- Caputi, T. L., & Humphreys, K. (2018). Medical marijuana users are more likely to use prescription drugs medically and nonmedically. *Journal of Addiction Medicine*, 12(4), 295-299. doi:10.1097/adm.0000000000000405
- Chen, Q., Larochele, M. R., Weaver, D. T., Lietz, A. P., Mueller, P. P., Mercaldo, S., Wakeman, S. E., Freedberg, K. A., Raphael, T. J., Knudsen, A. B., Pandharipande, P. V., & Chhatwal, J. (2019). Prevention of prescription opioid misuse and projected overdose deaths in the United States. *JAMA Network Open*, 2(2), e187621. doi:10.1001/jamanetworkopen.2018.7621
- Corroon, J. M., Jr., Mischley, L. K., & Sexton, M. (2017). Cannabis as a substitute for prescription drugs - A cross-sectional study. *Journal of Pain Research*, 10, 989-998. doi:10.2147/jpr.s134330
- Fiellin, L. E., Tetrault, J. M., Becker, W. C., Fiellin, D. A., & Desai, R.A. (2013). Prior use of alcohol, cigarettes, and marijuana and subsequent abuse of prescription opioids in young adults. *Journal of Adolescent Health*, 52(2), 158-163. doi:10.1016/j.jadohealth.2012.06.010
- Humphreys, K., & Saitz, R. (2019). Should physicians recommend replacing opioids with cannabis? *Journal of the American Medical Association*. doi:10.1001/jama.2019.0077
- Illinois General Assembly. (2018) Alternatives to Opioids Act of 2018, SB0336. Retrieved from [ilga.gov/legislation/BillStatus.asp?GA=99&DocTypeID=SB&DocNum=336&GAID=14&SessionID=91&LegID=100276](http://ilga.gov/legislation/BillStatus.asp?GA=99&DocTypeID=SB&DocNum=336&GAID=14&SessionID=91&LegID=100276)
- Memedovich, K. A., Dowsett, L. E., Spackman, E., Noseworthy, T., & Clement, F. (2018). The adverse health effects and harms related to marijuana use: An overview review. *CMAJ Open*, 6(3), E339-E346. doi:10.9778/cmajo.20180023
- National Institute on Drug Abuse. (2019). Overdose death rates. Retrieved February 5, 2019, from [drugabuse.gov/related-topics/trends-statistics/overdose-death-rates](http://drugabuse.gov/related-topics/trends-statistics/overdose-death-rates)
- New York State Department of Health. (2018). New York State Department of Health announces opioid replacement now a qualifying condition for medical marijuana. Retrieved from [health.ny.gov/press/releases/2018/2018-07-12\\_opioid\\_replacement.htm](http://health.ny.gov/press/releases/2018/2018-07-12_opioid_replacement.htm)
- Olfson, M., Wall, M. M., Liu, S.M., & Blanco, C. (2018). Cannabis use and risk of prescription opioid use disorder in the United States. *American Journal of Psychiatry*, 175(1), 47-53. doi:10.1176/appi.ajp.2017.17040413
- Reiman, A., Welty, M., & Solomon, P. (2017). Cannabis as a substitute for opioid-based pain medication: Patient self-report. *Cannabis and Cannabinoid Research*, 2(1), 160-166. doi:10.1089/can.2017.0012
- Sexton, M., Cuttler, C., Finnell, J. S., & Mischley, L. K. (2016). A cross-sectional survey of medical cannabis users: Patterns of use and perceived efficacy. *Cannabis and Cannabinoid Research*, 1(1), 131-138. doi:10.1089/can.2016.0007
- Shover, C. L., Davis, C. S., Gordon, S. C., & Humphreys, K. (2019). Association between medical cannabis laws and opioid overdose mortality has reversed over time. *Proceedings of the National Academy of Sciences*, 116(26), 12624-12626. doi:10.1073/pnas.1903434116
- Substance Abuse and Mental Health Services Administration. (2017). *Key substance use and mental health indicators in the United States: Results from the 2016 National Survey on Drug Use and Health*. Rockville, MD.
- Wen, H., & Hockenberry, J. M. (2018). Association of medical and adult-use marijuana laws with opioid prescribing for Medicaid enrollees. *JAMA Internal Medicine*, 178(5), 673-679. doi:10.1001/jamainternmed.2018.1007

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**Emerging Drug Trends Report | Hazelden Betty Ford Foundation Recovery Advocacy**

***Shedding new light on America's No. 1 public health problem***

This report was produced in collaboration with the University of Maryland School of Public Health, with support from the Hazelden Betty Ford Foundation's Butler Center for Research.

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Our mission is to provide a trusted national voice on all issues related to addiction prevention, treatment and recovery, and to facilitate conversation among those in recovery, those still suffering and society at large. We are committed to smashing stigma, shaping public policy and educating people everywhere about the problems of addiction and the promise of recovery.