

Regulating Marijuana Use in the United States: Moving Past the Gateway Hypothesis of Drug Use

*Jason F. Arnold
and Robert M. Sade*

Marijuana legalization in the U.S. is one of the largest public policy shifts in the past several decades. According to a recent Gallup poll, 66% of Americans now support legalizing marijuana, having risen by 30 percentage points since 2005.¹ The increase in public support for legalization has resulted in several states changing their laws. As of January 2020, 14 states and territories have passed laws legalizing adult use and sales of recreational marijuana.² A total of 33 states, District of Columbia, Guam, Puerto Rico, and U.S. Virgin Islands allow the use of medical marijuana/cannabis programs.³ Retail sales of medical and recreational marijuana in the U.S. will total \$12 billion in 2019, is projected to rise to approximately \$25 billion by 2023,⁴ and eventually might be much greater, as suggested by the annual spending on marijuana in the illegal black market, which was estimated to be \$50 billion in 2016.⁵

As more states consider legalizing marijuana, important questions remain about how such changes might affect public health. A frequent focus of debate is the question of whether marijuana use is a gateway drug to use of stronger drugs. The gateway hypothesis of drug use, which is often endorsed by elected officials and health educators, became popular in the 1970s to describe the often-observed progression from licit to illicit drug use.⁶ The hypothesis was originally used to support the idea that marijuana use caused heroin addiction; today, the gateway theory of drug use is applied to a wide range of substances, including nicotine as found in cigarettes and vaping products. We review emerging research around the gateway hypothesis of drug use and make recommendations for policymakers in states considering legalizing marijuana.

Jason F. Arnold, J.D., M.P.H., is a fellow at the New York Academy of Medicine and Assistant Director of the Clinical and Translational Research Ethics Program at the Medical University of South Carolina. He serves as Associate Editor (*Law and Ethics*) of the *Journal of Global Health Leadership* and as a member of the Clinical Research Ethics Consultation Collaborative, a national network of bioethicists who provide advice on ethical challenges encountered while conducting research. **Robert M. Sade, M.D.**, is Distinguished University Professor, Professor of Cardiothoracic Surgery, Director of the Institute of Human Values in Health Care, and Director of the South Carolina Clinical and Translational Research Institute (Clinical and Translational Science Award) Clinical Research Ethics Core at the Medical University of South Carolina. He currently chairs the Cardiothoracic Ethics Forum and serves as Associate Editor (*Ethics*) of the *Annals of Thoracic Surgery*. He is a former chair of the American Association for Thoracic Surgery Ethics Committee, the Society of Thoracic Surgeons Standards and Ethics Committee, and the American Medical Association's Council on Ethical and Judicial Affairs.

Gateway Hypothesis

A substantial body of research supports the gateway hypothesis of drug use. In 2014, a watershed study identified a biological process through which administering one drug influenced the reaction to a second drug. In the study, mice given nicotine in their water over a period of time showed addiction-related genetic changes and increased vulnerability to cocaine dependence.⁷

In this issue of the *Journal of Law, Medicine & Ethics*, Arthur Williams argues that cannabis is a gateway drug for opioid use disorder.⁸ He presents several key findings from the scientific literature to support his claim. He cites the earlier work of the Kandels (2014), noted above, and more recent lines of research that suggest the role marijuana might have as a gateway to opioids. Research has found several reasons to believe that the endocannabinoid and endogenous opioid systems in the brain interact.⁹ Williams discusses how marijuana use can worsen mental health outcomes for some individuals, producing anxiety, depression, cognitive deficits, and psychosis. He also raises concerns about adolescent marijuana use, concluding that marijuana use during adolescence may increase the risk for initiation of opioid use and subsequent development of opioid use disorder for some vulnerable individuals.

The gateway hypothesis is not without its critics, however. Scholars have examined the history and application of the gateway hypothesis and argued that it should be retired from use because it involves an oversimplification of the dynamics.¹⁰ Williams similarly discusses the multifactorial causes of substance use disorder: for example, trauma, genetic and familial risk, environmental risk factors (e.g., social networks, exposures), and untreated psychiatric comorbidity.¹¹ The framing of the debate around the gateway hypothesis of drug use is a distraction from other important issues, such as research. For example, Williams argues that the important question is not whether the gateway theory exists, rather, it is how we can develop research to best identify which adolescents are at risk and focus on trauma, mental health, and protective environments. Finally, some critics of the gateway hypothesis believe that instead of prohibiting marijuana use, we should accept its use based on ethical grounds of personal autonomy and political grounds of individual liberty.¹² These two factors underlie the growing movement toward liberalization of marijuana policy, as more jurisdictions across the U.S. continue to legalize marijuana. At this time, only nine states treat marijuana as fully illegal, while 41 states have enacted laws to: fully legalize (10, plus District of Columbia), decriminalize (3), legalize for

medical use only (17), or decriminalize and legalize for medical use (11).¹³

Policy Recommendations

Public health research provides important lessons for policymakers who are considering legalizing marijuana.¹⁴ Legalization of marijuana has often been accompanied by marketing campaigns that target adolescents and young adults, who are regularly exposed to marketing for recreational use on social media.¹⁵ To counter advertisements of marijuana products, policymakers in states that legalize marijuana should design marketing campaigns to educate the public about the potential adverse effects of marijuana use, particularly by adolescents and young adults. Adolescence and young adulthood are critical times for brain maturation because of ongoing neurodevelopment. The process of pruning and remodeling that occurs in the brains of young adults can be affected by marijuana use.¹⁶ Adults who begin using marijuana before the age of 18 are four to seven times more likely to develop marijuana use disorder than adults who develop marijuana use disorder but did not use it before the age of 18.¹⁷ Marijuana use is similarly linked to other substance use disorders such as nicotine addiction.¹⁸ Therefore, an important public health strategy would be to restrict the supply of marijuana to adolescents. Doing so may reduce potential harmful use.

Based on information from alcohol and tobacco marketing studies,¹⁹ states legalizing marijuana should set aside funds from tax revenue collected from the marijuana industry to design and fund prevention and cessation programs aimed at reducing marijuana use by adolescents and young adults. Marijuana advertisements or drug delivery devices that are specifically designed to target the young should be prohibited. Several jurisdictions that have legalized marijuana for adult recreational use have regulated the sales of marijuana-infused edibles, citing concerns that their design and advertising focus on young people.²⁰ California, for example, has banned edibles resembling fruit, animals, or humans, and the products cannot be referred to as “candy.” Cartoons, images, or other messaging that potentially appeal to children are also not permitted.²¹ More research is needed to examine the effectiveness of these policies.

Tobacco and alcohol studies have shown that targeting the supply of substances is a more effective approach for reducing use in youth than by focusing on possession.²² Williams has suggested that policymakers should limit the supply of marijuana to children and young adults by setting a minimum age of sale and use at 25.²³ We disagree with such a proposal because doing so may risk reestablishing the long-

standing black market that legalization has done so much to defeat. Recent research suggests that over-regulation in California, at both the state and local level, is bolstering the illicit marijuana market.²⁴ Therefore, regulation of advertising and availability of marijuana-infused edibles and drug delivery devices to youths may be a better approach to curbing the harmful effects of marijuana use than a strict prohibition of use through age 25. Increasing the minimum-purchasing age for buying marijuana to at least 21 would be more reasonable, as this policy would be consistent with tobacco and other vapor-related products.

open business accounts. One undesirable side effect of banks' refusal to accept funds from marijuana vendors is that it has led to a high rate of cash transactions for marijuana sales. Managers at marijuana dispensaries have expressed concern for the safety of their employees because an all-cash business may attract criminal attention.²⁸

Conclusion

Legalizing marijuana has been increasingly accepted across the U.S. As more states consider changing their laws in favor of legalization, policymakers should weigh

Therefore, the important issue for policymakers is not whether the gateway hypothesis is true, rather, it is how best to identify those individuals at risk and provide them with protections and services to prevent potential harm. For example, states that legalize marijuana should help adolescents through regulation of advertising and availability of marijuana-infused edibles and drug delivery devices. Such policies may assist in protecting neurodevelopment of the adolescent and young adult brain. To assist in establishing sound evidence-based policy through research, the federal government should remove its prohibition of marijuana sales and use, leaving their regulation to state law-makers.

The science arising from this field of study is still relatively new and current research methodology is insufficient to address the rapid changes occurring in the legal marijuana market. As the market grows, new sources of data will become available to researchers. For example, the marijuana industry is producing a tremendous amount of information through seed-to-sale tracking systems, market surveys, delivery services, loyalty card programs, and other sources.²⁵ Policymakers should work closely with representatives of the marijuana industry to find ways to share data collected from these new sources with researchers, who can then develop evidence-based insights about these emerging markets.²⁶ To assist researchers in this process, the federal government should remove its prohibition of marijuana sales and allow federal funding of scientific research in this field. Doing so might facilitate uniformity of data collection across jurisdictions by reducing the likelihood of a patchwork of competing and conflicting regulations, and will help bring transparency to the marijuana industry.²⁷ Lifting the federal prohibition will also help marijuana dispensaries, which currently have a difficult time negotiating leases with landlords and finding banks willing to

the possible adverse health effects of increased use of marijuana, particularly by the young. Many studies have shown that marijuana can negatively affect the cognitive development of adolescents, impairing attention, memory, and learning. Recent studies suggest that marijuana use may initiate opioid use, dose escalation, and OUD, but more research is needed. Therefore, the important issue for policymakers is not whether the gateway hypothesis is true, rather, it is how best to identify those individuals at risk and provide them with protections and services to prevent potential harm. For example, states that legalize marijuana should help adolescents through regulation of advertising and availability of marijuana-infused edibles and drug delivery devices. Such policies may assist in protecting neurodevelopment of the adolescent and young adult brain. To assist in establishing sound evidence-based policy through research, the federal government should remove its prohibition of marijuana sales and use, leaving their regulation to state law-makers.

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