

This research summary provides a brief overview of cannabis, its effects, and its impact on teens in the short term and long term as well as information about cannabis regulations in Montana. This research summary primarily focuses on the nonmedical use of cannabis.

Cannabis is “a generic term used to denote the several psychoactive preparations of the cannabis plant”.¹ Marijuana is the most common cannabis preparation and is “an herbal form of cannabis prepared from the dried flowering tops and leaves” of the Cannabis sativa plant.¹ The Cannabis sativa plant contains many different compounds called cannabinoids. While over 100 cannabinoids have been identified in the Cannabis sativa plant, the two main cannabinoids are cannabidiol (CBD) and delta-9-tetrahydrocannabinol (THC).¹ CBD is a non-psychoactive cannabinoid, which means it does not produce mind- or mood-altering effects.² THC is the psychoactive cannabinoid primarily responsible for the effects a person experiences from using cannabis.² Both CBD and THC are extracted from the Cannabis sativa plant.³ Marijuana contains substantial amounts of THC.²

Throughout this research summary, the term cannabis will be used instead of marijuana or other common terms used to describe marijuana including weed, pot, grass, dope, reefer, herb, bud, and Mary Jane. Cannabis has been “adopted as the standard terminology within science and scholarly communities”.⁴

How Is Cannabis Used?

Cannabis can be smoked, vaporized, brewed, and mixed in foods such as cookies, gummies, or brownies. When cannabis is rolled into a cigarette and smoked, it is called a joint; when it is smoked or inhaled in a pipe, it is called a bowl; and when it is smoked or inhaled in a water pipe, it is called a bong.^{4,5} Electronic vaporizers (called e-vaporizers or vapes) are also used.⁵ Smoking cannabis continues to be the most common way to ingest the drug because smoking or vaporizing releases the greatest amount of THC into the bloodstream, and the effects are felt within a few minutes.¹ When smoked or vaporized, the effects of cannabis usually peak at approximately 15-30 minutes and start to decrease within 2-3 hours.¹ When cannabis is consumed in foods (called edibles), the effects are delayed as the drug goes through the digestive system and usually take 30 minutes to 1 hour.⁶ When ingesting cannabis in foods, the effects can last for many hours.⁶

What Are the Effects of Cannabis?

The effects a person experiences from using cannabis vary. Cannabis effects depend on a variety of factors including how cannabis is administered, the person's history of cannabis use, the context in which the person is using cannabis, and the person's expectations.¹ Cannabis effects also depend on the potency of the cannabis. Cannabis potency refers to the amount of THC it contains,⁵ which has increased over the years.⁷ From 1995 to 2019, the percentage of THC in cannabis samples seized by the Drug Enforcement Agency (DEA) increased steadily from 3.96% in 1995 to 14.35% in 2019.⁷

Experiencing euphoria and a sense of calm and relaxation are common expectations of using cannabis, but some people experience anxiety or other negative effects like nervousness and acute psychotic symptoms.⁶ Other short-term effects of using cannabis include loss of coordination,¹ impaired cognitive functioning,^{8,9} slower reaction times, and muscle relaxation.² A person may also experience increased heart rate and blood pressure, increased appetite, and dry mouth.⁴ These short-term effects typically last a few hours.

Long-term health impacts, especially when a person uses cannabis regularly and over an extended period of time, include adverse effects on mental health such as anxiety and depression,^{10,11} cognitive impairment including attention and memory problems,⁸ and respiratory issues like chronic bronchitis and coughing.¹² Further, research suggests that those who use cannabis are at an increased risk of developing a substance use disorder.¹¹

Cannabis Use and Teens

The adverse effects of cannabis use among teens have been established.¹³ **Rapid brain development in the teen years may make teens more vulnerable to the effects of cannabis use¹⁴ and lead to negative outcomes later in life.^{15,16}** Given the research suggesting a wide range of negative health outcomes and potential harm associated with teens using cannabis, it is recommended that teens do not use cannabis.¹⁷

Cannabis use among teens can negatively impact learning, memory, and concentration, which can lead to decreases in school performance¹³ and adverse effects on educational attainment.^{16,18} For example, one study found that teens who were "daily users of cannabis before age 17 years had odds of high school completion and degree attainment that were 63% and 62% lower, respectively, than those who had never used cannabis".¹⁶ Another study found that younger age of first cannabis use was associated with decreased rates of high school completion, university enrollment, and degree attainment.¹⁹

The impact of cannabis use on school performance has also been found among students in Montana. According to the Alcohol and Other Drug Related Behaviors and Academic Achievement Report in 2019, “Montana students in 9th-12th grade who used cannabis made up 45% of students with poor grades, as opposed to 14% of students with mostly A’s”.²⁰

Cannabis use has also been linked to negative psychiatric effects.^{13,21,22}

One study found that daily users of cannabis before age 17 years old had odds of suicide attempts that were seven times higher than those who had never used cannabis.¹⁶ Gukasyan and Strain (2020) found depression was more prevalent among adolescents (ages 12-17) who had a history of cannabis use compared to those who had never used cannabis.²³ Another study found that use of cannabis among adolescents was positively associated with various psychiatric problems including depressive symptoms, symptoms of ADHD, conduct problems, anhedonia, and impulsivity.²⁴

Cannabis use has also been linked to other substance use and the development of substance use disorders.^{1,25} In Montana, students who used cannabis were “twelve times more likely to report using alcohol within the past 30 days and seven times more likely to report using other drugs within the past 30 days.”²⁰ Thus, sometimes cannabis is referred to as a “gateway” drug; however, the merits of such claims are debated in the literature.² Regardless, cannabis use in the teen years can increase one’s propensity to develop a substance use disorder later in life, although researchers note that this is a complex relationship that is influenced by a variety of individual factors.^{16,26} Teens who “begin using marijuana before age 18 are four to seven times more likely than adults to develop a marijuana use disorder”.²⁵ Further, early onset of marijuana use has been linked to reduced relationship satisfaction and life satisfaction.¹⁵

Cannabis use increases motor vehicle crash risk.^{27,28,29} Research has consistently shown a statistically significant relationship between recent cannabis use and increased risk of traffic crashes.^{27,28,29,30,31} For example, in a study examining recent cannabis use and collision risk, researchers found that cannabis use alone was associated with a fourfold increased odds of a collision.³¹ Hartman and Huestis (2013) found that recent use of cannabis was “associated with substantial driving impairment, particularly in occasional smokers”.²⁸

Perceptions of risks regarding cannabis use and driving may be influencing this behavior. For example, in a qualitative research study to explore perceptions among people who drive after cannabis use, it was found that many participants identified driving under the influence of cannabis was less risky than driving under the influence of alcohol or other drugs.³² Further, some participants did not believe that cannabis use impaired their driving ability or increased collision risk.³² A few participants believed that cannabis use improved their overall driving ability.³² In another study, participants tended to express beliefs that driving under the influence of cannabis was a low-risk behavior, but that it could be dependent on an individual's level of tolerance and response to the drug.³³ In this study, those who perceived driving after using cannabis as less risky were more likely to engage in the behavior.³³

Perceived risk of consuming cannabis and perceived use among peers are likely to influence cannabis use behavior.³⁴ In Montana, "1 in 2 students did not believe there is any harm in using cannabis weekly".²⁰ Among teens, the perception of risk associated with using cannabis may be declining.³⁵ In a study of adolescents' perceptions of risks and benefits of cannabis, researchers found that teens may be ambivalent about the dangers associated with cannabis use and overestimate the benefits.³⁶ Adolescents' perceptions of the risks and benefits of cannabis use are important as these perceptions may influence behavior.^{34,37} For example, in a study of adolescents in 32 European countries, a higher perception of risk associated with cannabis use was associated with decreased cannabis use.³⁴ Similarly, in a study of over 700 adolescents, researchers found higher perceptions of health and social risks related to cannabis use were associated with greater odds of not using cannabis.³⁷

Perception of cannabis use among peers may also influence cannabis use behavior,^{34,37,38} and teens may be overestimating cannabis use among their peers.³⁷ In one study, those who reported that their friends used cannabis had 27% greater odds of using cannabis themselves.³⁷ The influence of perception of cannabis use among peers has been identified in multiple studies.^{34,38} Closing misperception gaps may be an important strategy for preventing cannabis use.³⁷

Cannabis Regulations

There have been significant changes in acceptance, availability, and access to cannabis in the United States in recent years.⁴ Changes include the decriminalization of cannabis and the legalization of medical and recreational cannabis use.⁴ Notably, different states have implemented these cannabis policies to varying degrees. At the time of this research summary, 36 states and four territories allow for the medical use of cannabis products,³⁹ and 18 states, two territories, and the District of Columbia have legalized cannabis for recreational use.⁴⁰

In Montana, both medical and adult-use cannabis are legal. In 2004, Initiative 148 legalized medical marijuana.⁴¹ As of January 1, 2021, it is legal in Montana for adults 21 years of age and older to possess and use up to one ounce of cannabis and to cultivate up to two mature cannabis plants and two seedlings for private use in a private residence (with some restrictions).⁴¹ Starting on January 1, 2022, counties that supported Initiative 190 will have adult-use cannabis sales available; however, in counties that opposed Initiative 190, adult-use cannabis sales will remain prohibited.⁴¹

These recent state changes differ from the federal laws currently in place. To date, the federal government does not recognize the medical use of cannabis (other than the pharmaceutical-grade cannabinoids (i.e., Marinol)⁴ and continues under the Controlled Substance Act to classify certain parts of the Cannabis sativa plant as a controlled Schedule 1 drug because it is considered to 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”.³

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