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MARIJUANA AND TOBACCO USE
Fact Sheet

Marijuana: The Basics

- Marijuana is comprised of the dried flowers and leaves of the *Cannabis sativa* plant. It is composed of many chemicals, including over 100 cannabinoids that can have different biological effects. Two primary cannabinoids are delta-9 tetrahydrocannabinol (THC) and cannabidiol (CBD). THC is marijuana's main psychoactive ingredient which causes an intoxicating high and euphoria. CBD does not produce a high and is not intoxicating. It is being studied for its effectiveness as a medicine to treat seizures and other neurological disorders such as epilepsy and multiple sclerosis. Additionally, THC, CBD, and other cannabinoids are being studied for potential therapeutic benefits to treat appetite loss, nausea, chronic pain, insomnia, inflammation, and glaucoma [1-3].

- THC concentration levels determine the psychoactive impact of marijuana. Over time, marijuana has been genetically modified to yield plants with higher THC concentration [4]. THC concentration increased from 3.7 percent in the early 1990s to 9.6 percent in 2013. For higher concentration marijuana known as sinsemilla, or "skunk," the THC increased from 7.5 percent in the 1990s to 16 percent in 2013 [2].

- The THC content of marijuana products is associated with the intensity of the effects experienced by users. Favorable effects may include calming, relaxing, stimulating, or uplifting feelings. There may also be unfavorable effects like anxiety, panic attacks, and paranoia. Higher THC content may intensify and exacerbate unfavorable effects [4, 5].

- Marijuana can be used or consumed in several ways, including via combustible smoking, vaping, dabbing, in edible form such as candies, cookies, and other baked foods, and in liquid form including teas and flavored beverages [2] [6]. Other methods of use or consumption of marijuana include pills, tinctures, sprays, oils for cooking, creams, ointments, eye drops, and suppositories [7].

Marijuana and Secondhand Smoke

- Secondhand marijuana smoke contains many of the same chemicals and carcinogens as secondhand tobacco smoke. Results from laboratory testing under standard conditions found that secondhand marijuana smoke contained more than twice as much tar and ammonia as tobacco smoke, and more than eight times as much hydrogen cyanide [8].

- An experiment in which nonsmokers were exposed to secondhand marijuana smoke resulted in detectable cannabinoid levels in blood and urine. In this study, nonsmokers were situated in close proximity to marijuana smokers. Blood and urine specimens of nonsmokers that were collected in a room without ventilation tested positive for THC for up to three hours following cessation of exposure. Ventilating the room through a system that mimicked air conditioning significantly diminished the number of positive results [9].

- Exposure to tobacco secondhand smoke adversely affects cardiovascular health and impairs blood vessel function in humans and in rats. A study using a rat model showed that, similar to tobacco, marijuana secondhand smoke exposure impairs the ability of arteries to vasodilate (regulation of diameter based on conditions). The exposure to marijuana secondhand smoke impaired vessel function for much longer than the exposure to tobacco smoke. Although impairment is temporary, repeated exposure leads to long-term impairment [10].

- In 2015, the American Society of Heating, Refrigeration and Air-Conditioning Engineers (ASHRAE), the organization that develops engineering standards for building ventilation systems, expanded their definition of Environmental Tobacco Smoke (ETS) to include marijuana smoke and the emissions produced by electronic smoking devices [11]. ASHRAE concluded that ventilation systems cannot eliminate ETS [12].

- California state law prohibits smoking medical marijuana in any place where smoking cigarettes is prohibited by law. Smoking medical marijuana is also banned within 1,000 feet of a school or youth center [13].

Marijuana Use Prevalence and Perception of Harm

- Nationally, among high school students in 2015, marijuana use exceeded cigarette use; 21.3 percent of high school seniors reported using marijuana in the past 30 days, compared with 11.4 percent who smoked cigarettes [14].

- In California from 2013-2015, five percent of 7th graders, 13.4 percent of 9th graders, and 20.1 percent of 11th graders reported using marijuana in the past 30 days [15].

- In 2013-2014, of the ten states with the highest rates of past month marijuana use among adolescents aged 12 to 17, five were states/jurisdictions that had legalized commercial marijuana (Colorado, Alaska, Washington, Oregon, and the District of Colombia), and the remainder were states that had medical marijuana programs. Colorado had the highest reported past month marijuana use for adolescents aged 12 to 17, at 12.56 percent [16].

- Nationally, daily marijuana use among high school students increased, with 6 percent of high school seniors reporting daily use in 2015, compared to 5.2 percent in 2009. Among 10th graders, 3 percent reported daily use in 2015, compared to 2.8 percent in 2009 [14].

- The perceived risk of harm associated with marijuana use is decreasing. Nationally, in 2015, only 31.9 percent of high school seniors thought regular marijuana smoking was harmful; in 2009 the rate was 52.4 percent [14].

- Nationally, in 2015, 79.5 percent of high school seniors reported that it was easy to get marijuana [14]. In California from 2013-2015, 70 percent of 11th graders reported it was fairly easy or very easy to get marijuana; in comparison, 63.1 percent of 11th graders reported it was fairly easy or very easy to get cigarettes [15].

- In the past decade, the prevalence of past year adult use of marijuana in the United States (U.S.) doubled, from 4.1 percent in 2001-2002 to 9.5 percent in 2012-2013. Nationally, in 2012-2013, 30 percent of marijuana users met the criteria for marijuana use disorder, defined with symptoms including taking increasing amounts of the substances over a longer period than intended, inability to cut back, and failure to fulfill obligations. When examined by age, young adults aged 18 to 29 were at the highest risk for marijuana use and disorder, with use having increased from 10.5 percent to 21.2 percent, and disorder increasing from 4.4 percent to 7.5 percent [17].

- Past year marijuana use among African American adults increased in the U.S. from 4.7 percent in 2001-2002 to 12.7 percent in 2012-2013, and marijuana use disorder increased from 1.8 percent to 4.6 percent. Among Latinos, use increased from 3.3 percent to 8.4 percent, and disorder increased from 1.2 percent to 2.8 percent [17].

- In 2016, 9.5 percent of California adults aged 18 to 64 used marijuana or marijuana hash oil at least one day in the past 30 days. In comparison, this survey found that 13.6 percent of 18 to 64 year-olds had smoked cigarettes in the past 30 days [18].

Adverse Health Effects and Other Risks

Brain Development and Cognition

- Regular marijuana use in adolescence is associated with changes to areas of the brain involved in executive functions like memory, attention, learning, retention, and impulse control [19], [20], [21].
- A longitudinal study of more than 20 years found that at the age of 38, the Intelligence Quotient (IQ) scores of heavy and early onset marijuana users declined by an average of eight points from their IQ at the age of 13 [19]. The average IQ of heavy users was below 70 percent of their peer group [22].
- Early marijuana use is associated with impaired school performance and an individual who initiates marijuana use is 2.3 times more likely to drop out of high school than a non-user [23],[24].

Mental Health

- Marijuana use, especially in adolescents and young adults [25], is significantly associated with higher risk of anxiety disorders [26] and psychoses [27], higher odds of occurring suicidal thoughts [27, 28], and increased risk of unipolar depression [29, 30].
- Young people with a first episode of psychosis who stop using cannabis have better clinical outcomes (e.g., fewer psychotic symptoms and better social functioning) than those who persist using [31, 32].

Cardiovascular and Respiratory Systems and Cancer

- Among individuals aged 15 to 54, recreational marijuana use is independently associated with a 17 percent increased likelihood of acute ischemic stroke hospitalization [33].
- Among individuals who had experienced a heart attack, use of marijuana on a weekly or more frequent basis was significantly associated with a greater risk of death compared to those who did not use marijuana [34].
- A large cohort study that followed marijuana users over a 20-year period found that respiratory function, as measured by forced expiratory volume (FEV), significantly decreased among heavy marijuana users reporting use of marijuana more than 20 times per month. The decline in respiratory function among heavy marijuana users over time may be due to either frequent deep inhalation and breath holding or the bronchodilatory effects of THC [35].
- There is an increased risk for testicular cancer among marijuana users which appears to be associated with early use (prior to the age of 18 years of age), heavy use, and long term use (ten or more years) [36-38].

Dependency and Other Substance Use

- Approximately nine percent of marijuana users become addicted to marijuana [30, 39]. This rate rises to 17 percent for those who started using marijuana in adolescence [40] and 25 percent to 50 percent for daily users [41].
- Compared with persons who begin to use marijuana in adulthood, those who begin in adolescence are approximately two to four times more likely to have symptoms of marijuana dependence within two years after first use [1, 42].
- Over 50 percent of marijuana dependent persons are diagnosed with a further mental disorder or health impairment from consumption of other substances at some point in their lives [43].
- Studies of twins have found that the twin who had used marijuana was more likely to have used other illicit drugs than the co-twin who had not [30, 44, 45].

Intoxication and Impaired Driving

- Marijuana use increased the risk of becoming involved in a car accident at any level of severity by about 25 to 50 percent [46].
- A survey among 320 recent marijuana users showed that 87 percent of them reported an over 50 percent probability of future driving under the influence of marijuana, even after having been shown data on the increased crash risk [47].
- In 2016, over 38 percent of current California marijuana users aged 18 to 64 years old reported driving a vehicle within three hours of using marijuana [18].

The Triangulum: Marijuana, Tobacco, and Electronic Smoking Devices (ESD)

Marijuana and Tobacco

- A 10-year cohort study found that weekly or more frequent use of marijuana in teenaged non-smokers predicted a more than 8-times increased odds of initiation of tobacco use in later life. For 21-year-old smokers that were not yet nicotine-dependent, daily marijuana use raised the odds of nicotine dependence at the age of 24 years by more than three times [48].
- A long-term study found that nearly 40 percent of adolescents age 15 to 16 who were regular cigarette smokers used marijuana at age 42-43, which was 17 percent higher than adolescent non-regular cigarette smokers [49].
- The prevalence of current marijuana use among high school students who were current cigarette or cigar users increased from 51.2 percent in 1997 to 62.4 percent in 2013, while the prevalence dramatically increased among African American (66.4 percent to 82.0 percent) and Latino (54.9 percent to 73.6 percent) students from 2009 to 2013. During the same period, the prevalence of current marijuana use among non-cigarette or cigar users more than doubled from 4.2 percent to 10.2 percent [50].
- Early onset of cigarette use is significantly associated with 66 percent higher odds of initiating marijuana use and 74 percent higher odds of re-initiating marijuana use [51].

- Adolescent regular cigarette smokers showed 68 percent significantly higher odds of using marijuana in middle age (age 42-43), compared to adolescent non-regular cigarette smokers [49].

Marijuana and Electronic Smoking Devices (ESD)

- ESD can be modified to efficiently vape marijuana in the form of highly concentrated liquid hash oil and waxy forms of THC, or dried cannabis buds or leaves. THC concentrations of vaporized hash oil and waxes can exceed that of dried cannabis by four to 30 times [52, 53].
- A study of Connecticut high school students showed that vaping marijuana was common among lifetime ESD users (18.0 percent), lifetime marijuana users (18.4 percent), and lifetime dual users (26.5 percent) [54].
- Both ESD users and lifetime marijuana users are more likely to vaporize marijuana using ESD than non-ESD users and non-marijuana users [54].

Marijuana Policy

Legality of Marijuana Use: State and Federal Laws

- Federal law established five schedules for controlled substances. Marijuana is classified as a Schedule I controlled substance. Under federal law, controlled substances classified as a Schedule I drug have a high potential for abuse, have no currently accepted medical use for treatment in the U.S., and there is a lack of accepted safety for use of the drug under medical supervision [55].

- Although the cultivation, manufacturing, distribution, and possession of marijuana remains illegal under federal law, in 2013 the U.S. Department of Justice issued an updated enforcement memorandum known as the "Cole Memo." This memo set new priorities for federal prosecutors operating in states that had legalized medical or commercial marijuana. The eight enforcement priorities, which include preventing distribution to minors and preventing diversion to other states, provides a roadmap for robust state regulation of marijuana; so long as states enact strict laws and regulations in compliance with these priorities, it is reasonably expected that the federal government will have a hands-off approach to law-abiding citizens [56].

- As of June 2016, California and 24 other states plus the District of Columbia and Guam have enacted laws permitting medical marijuana use. Of these jurisdictions, five had also legalized commercial marijuana use [57].

Reasonable Accommodation for Medical Marijuana Use

- California state medical marijuana law does not require accommodation of medical marijuana use on the property or premises of any workplace or during the hours of employment [58].

- The Fair Housing Act prohibits discrimination in housing on the basis of race, color, religion, sex, national origin, familial status, and handicap [59]. The Fair Housing Act explicitly excludes illegal use of or addiction to a controlled substance under federal law, including marijuana from the definition of "handicap" [60].
- Under the federal Fair Housing Act, it is not considered "reasonable" to accommodate requests to use medical marijuana if it could potentially expose others to secondhand marijuana smoke [61].
- Under federal law, public housing agencies and owners of other federally assisted housing may not permit the use of medical marijuana as a reasonable accommodation because persons currently using illegal drugs, including medical marijuana, are categorically disqualified from protection under the "disability" definition in the Rehabilitation Act (Section 504) and the Americans with Disabilities Act (ADA) [62].

Medical Marijuana Use Prohibited in Public Housing

- According to a 2011 U.S. Department of Housing and Urban Development (HUD) Memorandum, public housing agencies may not permit use of medical marijuana, are required to deny applications or terminate assistance if the resident is a known marijuana user, and may choose to evict the resident regardless of state policy on marijuana use [63].

California Medical Marijuana versus Tobacco Products Laws: A Comparison of Selected Policy Areas

Policy Area	Medical Marijuana	Tobacco Products (including ESD)
Minimum Age of Sale or Furnishing	Qualified patients with a physician's recommendation, and their designated primary caregivers, may obtain medical marijuana [64]. Qualified patients under 18 years old who have a physician's recommendation may obtain medical marijuana and may apply for a medical marijuana identification card with parental or legal guardian consent or if they are an emancipated minor [65, 66]. It is illegal for an adult 18 years of age and older to furnish any marijuana to minors 14 years of age or older [67].	The sale or furnishing of tobacco products to persons under 21 years of age is illegal, with the exception of active duty military who are at least 18 years of age [68].
Minimum Age to Sell	Adults 18 years of age and older are prohibited from using minors to transport, carry, sell, give away, or prepare for sale any marijuana [67].	State law does not require a minimum age for a person to sell or furnish tobacco products.
Smoke-Free Housing	A landlord of a residential dwelling unit is authorized to prohibit smoking medical marijuana on the property or in any building on which it is located [69, 70].	A landlord of a residential dwelling unit is authorized to prohibit smoking tobacco products, on the property or in any building on which it is located [69].
Local Control	Local governing bodies are authorized (not preempted) to: 1) regulate the location, operation, or establishment of a medical marijuana cooperative/collective; and 2) prohibit medical marijuana smoking in public places [71].	Local governing bodies are authorized (not preempted) to regulate the smoking of tobacco products, including a complete ban [72]. State tobacco licensing law does not preempt or supersede any local tobacco control law, other than those related to state tax collection. Local licenses may be suspended or revoked for violation of a state tobacco control law [73].

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