COMMON CLAIMS ON CANNABIS USE

CLAIM	STRENGTH OF SUPPORTING EVIDENCE	BOTTOM LINE
"Cannabis [is] as addictive as heroin."	Weak	A lifetime of cannabis use carries a low risk of dependence (9%), while the risk of cannabis dependence is very low among those who report using it for one year (2%) or even 10 years (5.9%). This is much lower than the estimated lifetime risk of dependence to heroin (23.1%).
"[D]id you know that marijuana is on average 300 to 400 percent stronger than it was thirty years ago?"	Moderate	Although this claim overstates the existing evidence, studies do suggest that there have been increases in THC potency over time in some jurisdictions.
"I'm opposed to legalizing marijuana because it acts as a gateway drug."	Weak	Evidence to date does not support the claim that cannabis use causes subsequent use of "harder" drugs.
Cannabis use "can cause potentially lethal damage to the heart and arteries."	Weak	There is little evidence to suggest that cannabis use can cause lethal damage to the heart, nor is there clear evidence of an association between cannabis use and cancer.
Cannabis use lowers IQ by up to 8 points.	Weak	There is little scientific evidence suggesting that cannabis use is associated with declines in IQ.
Cannabis use impairs cognitive function.	Moderate	While the evidence suggests that cannabis use (particularly among youth) likely impacts cognitive function, the evidence to date remains inconsistent regarding the severity, persistence, and reversibility of these cognitive effects.
"[Cannabis] is a drug that can result [in] serious, long-term consequences, like schizophrenia."	Weak	While scientific evidence supports an association between cannabis use and schizophrenia, a causal relationship has not been established.

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CLAIM	RESPONSE
"Cannabis [is] as addictive as heroin." *– Daily Telegraph (Fox, 2014)*	• There is no scientific evidence to suggest that cannabis has the same addictive potential as heroin. Scientific research has found that less than 1 in 10 people who use cannabis across their lifetime will progress to cannabis dependence, meaning that more than 90% do not become addicted (Anthony et al., 1994). The lifetime probability of becoming heroin-dependent, meanwhile, has been estimated at 23.1% (Anthony et al., 1994). Interestingly, the addictive potential of cannabis is also significantly lower than other illegal drugs, as 20.9% of lifetime cocaine users, 22.7% of lifetime alcohol users, and 67.5% of lifetime nicotine users are estimated to become dependent (Lopez-Quintero et al., 2011). • The addictive potentials of cannabis after one year and ten years of use are even lower than the lifetime probability. For those that use cannabis for one year and for those that use cannabis for ten years, 98% and 94%, respectively, do not become dependent (Lopez-Quintero et al., 2011). • These findings reinforce the need to avoid making general claims about drugs and addiction. Many illegal and legal drugs, and many activities (i.e., gambling), have an addictive potential. As with the use of all drugs, cannabis use should be conceived along a spectrum ranging from non-problematic to problematic use. To that end, over 90% of cannabis users fall on the non-problematic side (Anthony et al., 1994). • Moreover, addiction to different substances is not necessarily related to equivalent harms. The negative consequences associated with cannabis dependence are far less than those associated with addiction to alcohol, cocaine, or heroin. • Criminalization accentuates the health harms associated with drug dependence. By stigmatizing people with addictions, a punitive policy environment limits people's accessibility to the public health services they may need to stay healthy (Wood et al., 2010). • By contrast, it is likely that cannabis users will be more likely to interact with trained public health officials under a regulatory system, which could foster an increase in the uptake of health services for those facing dependence, as has been seen in some settings that have decriminalized drug use like Portugal and Switzerland (Dubois-Arber et al., 2008; Hughes & Stevens, 2007; Nordt & Stohler, 2006).

BOTTOM LINE: A lifetime of cannabis use carries a low risk of dependence (9%), while the risk of cannabis dependence is very low among those who report using it for one year (2%) or even 10 years (5.9%). This is much lower than the estimated lifetime risk of dependence to heroin (23.1%).

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CLAIM	RESPONSE
"[D]id you know that marijuana is on average 300 to 400 percent stronger than it was thirty years ago?" *– Health Canada advertisement (Daro, 2014)*	• Scientific evidence suggests that cannabis potency, as measured by levels of THC, has increased in recent decades in some jurisdictions. In the United States, recent studies have cited average increases of 3% to 12% in THC content over the past three decades (El Sohly, 2014), which is equivalent to a 300% increase. Significant increases have not been detected for European countries other than the United Kingdom and the Netherlands (McLaren, Swift, Dillon, & Allsop, 2008). • THC levels alone paint an incomplete picture of the impacts of cannabis potency. Other factors, such as the preparation and method of consumption, complicate our understanding of the effect of cannabis potency. For example, the common practice of mixing cannabis with tobacco effectively dilutes potency to levels below what would be experienced if it were smoked pure. • Concerns over increases in cannabis potency are rooted in the assumption that higher levels of THC are harmful to health. However, the harms of increased cannabis potency are not yet fully understood by scientists. Perhaps counterintuitively, some research suggests that higher cannabis potency may actually lead to a reduction in health harms (especially related to smoking), as consumers might reduce the volume they consume (Van der Pol et al., 2014). • It is important to remember that increases in cannabis potency in the United States have taken place despite increased efforts in reducing the illegal cannabis supply (Werb et al., 2013). Moreover, because stronger strains provide higher profits per unit weight, trends towards increasing potency are primarily a result of criminal-market economics. Prohibition has not been able to keep cannabis potency down, and has arguably contributed to driving it up. • Importantly, under prohibition, illegal cannabis markets face zero quality control requirements. A strict, legally regulated market for cannabis would put the regulation of THC levels in the hands of governments and public health officials, not criminal entrepreneurs. In the case that cannabis potency is found to be associated with greater health harms, the regulation of cannabis markets by governments becomes even more vital.

BOTTOM LINE: Although this claim overstates the existing evidence, studies do suggest that there have been increases in THC potency over time in some jurisdictions.

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CLAIM	RESPONSE
"I'm opposed to legalizing marijuana because it acts as a gateway drug." *– Enrique Peña Nieto, President of Mexico (Khazan, 2013)*	• Scientific evidence suggests that cannabis use often precedes the use of "harder" illicit drugs, such as cocaine and heroin (W. Hall, 2014). However, there is no evidence to suggest that the use of cannabis causes or increases the risk that an individual will move on to use other drugs. • Scientists have explored alternative explanations for why cannabis use tends to take place before the use of "harder" substances. For instance, people who use cannabis may be more likely to use other drugs because they have entered an illicit drug market that features cannabis alongside other drugs, or because of personality traits (e.g., sensation seeking, impulsivity) that make them more likely to try drugs in general (W. D. Hall & Lynskey, 2005). Regardless of the reason, studies have not been able to convincingly remove these and other possible major explanations and thereby prove that cannabis acts as a "gateway" drug. • Interestingly, in some countries, use of alcohol and tobacco use has been shown to be more strongly linked than cannabis to the later use of other illicit drugs (Degenhardt et al., 2010).

BOTTOM LINE: Evidence to date does not support the claim that cannabis use causes subsequent use of "harder" drugs.

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CLAIM	RESPONSE
Cannabis use "can cause potentially lethal damage to the heart and arteries." *– World Federation Against Drugs (World Federation Against Drugs, 2015)*	• Claims asserting that cannabis use causes "lethal damage" to the heart are overstating the existing scientific research. Given major gaps in the evidence, research is needed to understand the potential cardiovascular harms of cannabis use. • The impact of cannabis use on heart health is currently not well understood (Volkow et al., 2014). Cannabis use has been found to be associated with acute effects that can trigger events like heart attack or stroke (Jouanjus, Lapeyre-Mestre, & Micallef, 2014; Thomas, Kloner, & Rezkalla, 2014), particularly among older adults (W. Hall, 2014). However, clear causal linkages have not been established. • With respect to the broader impact of cannabis use on physical health, studies have found that low, occasional cannabis use does not adversely affect the lungs (Pletcher et al., 2012). However, the impact of long-term cannabis smoking on respiratory function is less clear (W. Hall, 2014). Some studies have reported that smoking cannabis is associated with various respiratory-related problems (Gordon, Conley, & Gordon, 2013; Tashkin, 2013; Tashkin, Baldwin, Sarafian, Dubinett, & Roth, 2002), whereas others have found no strong association with several lung conditions (Tashkin, 2013). The impact of cannabis smoking on lung cancer, in particular, remains unclear (Hashibe et al., 2006). • It is worth noting that the risks of illness and death associated with the use of tobacco and alcohol are much higher than those associated with cannabis. For example, evidence has found far greater risk of lung problems among tobacco users compared to regular cannabis users (Tashkin, 2013). Hence, the legal status of a drug should not be interpreted as meaning that it poses lower health risks than illegal drugs. This is useful to remember given that calls to sustain the prohibition of illegal drugs, like cannabis, are often accompanied with assertions about their health harms. • Harm reduction strategies that substitute smoking cannabis with other routes of administration can be effective at decreasing the negative health consequences of cannabis use, particularly on the lungs. Compared to what is possible under prohibition, a regulated market in which cannabis is purchased from licensed dispensers can allow for a greater range of harm reduction strategies such as "vaping" or edible consumption.

BOTTOM LINE: There is little evidence to suggest that cannabis use can cause lethal damage to the heart, nor is there clear evidence of an association between cannabis use and cancer.

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CLAIM	RESPONSE
Cannabis use lowers IQ by up to 8 points.	• There is little scientific evidence suggesting that cannabis use lowers general intelligence, as measured by IQ. A single study (Meier et al., 2012) is frequently cited to support the claim that cannabis use is associated with declines in IQ of 8 points. Basing any general claim on one study is problematic, especially when the 8-point drop in IQ was found only among a very small subsample of participants (i.e., 38 participants), representing 3.7% of the total sample. Additionally, a more recent review of this same data suggests that the findings linking cannabis use to IQ declines may actually be the result of unmeasured socioeconomic factors (Rogeberg, 2013). • Interestingly, a more recent (and larger) study found that alcohol use was associated with declines in IQ rather than cannabis use (Mokrysz et al., 2014). The scientists also suggested that early-onset substance use more generally, rather than cannabis use specifically, may lead to lower IQ. In short, the evidence that cannabis use is associated with declines in IQ is very weak. • It is worth highlighting that different people are impacted by cannabis use differently. Research suggesting that cannabis use can have certain impacts on the brain will not apply to all cannabis users in all situations.

BOTTOM LINE: There is little scientific evidence suggesting that cannabis use is associated with declines in IQ.

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CLAIM	RESPONSE
Cannabis use impairs cognitive function.	• While there is moderate evidence that early-onset and sustained cannabis use is associated with impairments in cognitive function, there are gaps in the scientific evidence on the full range of effects and their reversibility. Hence, this general claim requires clarification, as well as further research. Moreover, even where research suggests that cannabis use can have certain impacts on the brain, this will not be the case for every cannabis user in every situation. • Unsurprisingly, evidence has shown that during intoxication, cannabis use has acute effects on cognitive functions, such as learning and memory (Crane, Schuster, Fusar-Poli, & Gonzalez, 2013). Some scientific studies have found associations between heavier, long-term cannabis use and impairments in cognitive areas such as memory, attention, and verbal learning, particularly when use is initiated during adolescence (W. Hall, 2014; Volkow, Baler, Compton, & Weiss, 2014). However, these studies have reported different outcomes with respect to the permanence of these impairments. Given the current state of the scientific research, the simple assertion that cannabis leads to reduced cognitive function is misleading. • Claims about the impact of cannabis use on cognitive functioning are at times accompanied by assertions that use leads to school failure, later unemployment, problems with life satisfaction, and other poor outcomes or psychosocial harms. However, scientists have not been able to remove all other possible explanations, and as such the evidence is weak in clearly establishing associations between cannabis use and these outcomes (Fergusson & Boden, 2008; Townsend, Flisher, & King, 2007). It's also noteworthy that a systematic review of all longitudinal scientific studies on this topic found that the evidence did not support a causal relationship between cannabis use by young people and various psychosocial harms (Macleod et al., 2004).

BOTTOM LINE: While the evidence suggests that cannabis use (particularly among youth) likely impacts cognitive function, the evidence to date remains inconsistent regarding the severity, persistence, and reversibility of these cognitive effects.

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CLAIM	RESPONSE
[Cannabis] is a drug that can result [in] serious, long-term consequences, like schizophrenia." *– Kevin Sabet, Smart Approaches to Marijuana (Baca, 2015)*	• While some studies point to a link between cannabis use and an increased risk of symptoms associated with schizophrenia (Fergusson, Horwood, & Ridder, 2005; Zammit, Allebeck, Andreasson, Lundberg, & Lewis, 2002), a recent study concluded that cannabis use by itself did not increase the risk of schizophrenia (Proal et al., 2014). Scientists have repeatedly noted the difficulty of establishing causality in studies about cannabis use and mental illness (Moore et al., 2007; Volkow et al., 2014). This means that while people who develop schizophrenia may have previously used cannabis, it is difficult to unequivocally state that this use is what caused them to develop the condition (Pierre, 2011). • If cannabis use caused schizophrenia, we would expect to see increases in incidence as rates of cannabis use have increased, but this trend has not been observed (Hall, 2014). One UK-based study reported that, given that cannabis use has increased fourfold among the UK population between the early 1970s and 2002, there should be a corresponding 29% increase in cases of schizophrenia among men, and 12% increase among women between 1990 and 2010 (Hickman et al., 2007). Instead, during this time period (1996-2005), it was found that annual cases of schizophrenia in the UK were either stable or declining (Frisher et al., 2009). These findings strongly suggest that cannabis use does not cause schizophrenia. • Scientific research has suggested that young people who are genetically predisposed to schizophrenia may have their risk of developing this condition increased by using cannabis (Caspi et al., 2005). However, scientific findings are inconsistent on the magnitude of risk posed by cannabis use, as well as the frequency of use that is associated with mental illness (Andréasson, Engström, Allebeck, & Rydberg, 1987; Caspi et al., 2005; Moore et al., 2007).

BOTTOM LINE: While scientific evidence supports an association between cannabis use and schizophrenia, a causal relationship has not been established.

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