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Adolescents and Perceived Riskiness of Marijuana: Why Care?

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Marijuana legalization is arguably one of the most polarizing and thought-provoking issues of our time and has generated substantial discussion in the scientific community. One of the observed effects of legalizing marijuana for 'medical' and 'recreational' use in jurisdictions that have chosen this path has been changes in the perceived riskiness of the substance. Historically, perceived riskiness has been shown to be associated with rates of use of different substances such as tobacco and alcohol, where lower perceived riskiness generally meant higher frequency and intensity of use [1]. When it comes to marijuana, the association between perceived riskiness and patterns of use is less clear, with some recent studies revealing that the impacts of marijuana legalization on perceived riskiness and patterns of use among youth vary among US states and age groups [2,3].

In an article published in this issue of the *Journal of Adolescent Health*, Braymiller et al. use latent-class analysis to look deeper into the perceived riskiness of marijuana among different subgroups of high school seniors [4]. They concluded that between 2010 and 2016, a period in which marijuana was legalized for recreational purposes in 8 US states, the proportion of youth identifying as "tolerant nonusers" or "marijuana enthusiasts" increased significantly while the proportion of youth identifying as "intolerant nonusers" decreased. The authors suggest that these shifts could be indicative of marijuana becoming more normative among teens and highlight the need for prevention and intervention efforts targeting behaviors and attitudes around marijuana.

Substantial attention has been paid to recent ecologic data suggesting that legalization of marijuana for medicinal and recreational use may have contributed to declines in opioid prescribing and opioid-related harm among adults [5,6]; however, these potential benefits need to be weighed against the fact that marijuana use during adolescence and young adulthood carries significant health risks, especially on the developing brain [7,8]. Two studies have shown a sequential association between early marijuana exposure and increased risk of psychosis later in life [9] as well as a long-term loss in intellectual quotient in

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adolescents who have used marijuana on a regular basis [10]. Also forthcoming are the results of a 10-year cohort study with 10,000 adolescents, funded by the National Institutes of Health, which has been designed to test the hypothesis that marijuana may not only be *associated* with negative impacts on the developing brain, but also be a *cause* [11].

When discussing perceived riskiness and health impacts of marijuana use it is important to consider that marijuana products that are currently in circulation, both on the streets and in dispensaries, are very different from the products that were available in the 1970s when the prevalence of adolescent substance use was first tracked by large national surveys [12]. In fact, the concentration of tetrahydrocannabinol or THC, the main psychoactive component of marijuana has increased from 3% to 4% percent to over 15% in smoked marijuana; in addition, many youths use high potency products such as cannabis oils, waxes or 'dabs', which often contain up to 80% THC [13]. The long-term effects of being exposed to such high amounts of THC are still ill-defined. We do, however, have evidence that with increasing availability of high potency medicinal and recreational marijuana products in states that have legalized them, emergency room visits related to marijuana use have significantly increased [14]. Another reason for concern is the high proportion of adolescents (up to 40%) who report experiencing an acute psychotic symptom after using marijuana, such as paranoia and hallucinations [15].

The term 'medical marijuana'—a term coined and embraced by industry—is an important source of confusion among adolescents. In our clinical practice as pediatricians working both in primary care and in specialized adolescent substance use treatment programs, we often hear from our patients that medical marijuana is a healthy, purer alternative to other substances such as alcohol, and that marijuana is safe because it is legal. In considering that hundreds of different marijuana products are currently available in marijuana dispensaries and only four marijuana-derived medications (including the recently FDA-approved cannabidiol-based medication, Epidiolex) exist for which rigorous research has been conducted, it is clear that there is an important research gap. Given how quickly policy changes are unfolding, there is a great need for studies establishing the potential benefits and harms of different marijuana products both for youth and for older adults. This is especially true for all forms of smoked 'medical marijuana' products, for which evidence remains extremely limited [16].

Trends in use of marijuana have evolved very differently from those of most other substances. Whereas rates of alcohol and drug use have been steadily decreasing (with the notable exception of e-cigarettes, which have recently become extremely popular among middle and high school students), rates of past-year marijuana use have remained relatively stable among high school students, with a notable increase in rates of daily marijuana users [17]. Considering that adolescents who use marijuana are at much higher risk of using other substances, increases in rates of daily marijuana users, combined with decreases in perceived riskiness should not be taken lightly as they could compromise many years of public health progress.

Changes in public policy around marijuana legalization come with an important responsibility for health providers and policymakers to protect the health and well-being of

the population. The increasing acceptability and ease of access to marijuana, warrant serious, unbiased and proactive conversations about how to balance potential benefits of marijuana used for medicinal purposes while protecting the developing brains of youth in current and future generations. Whereas the rapid rise in opioid overdose deaths caught many by surprise, we have the means to prevent potentially harmful health impacts of marijuana legalization on adolescents as more and more jurisdictions move in this direction. Investigating and discussing the shifts in perceived riskiness of marijuana and potential consequences is a step in the right direction.

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