

# Understanding the Highs and Lows of Adolescent Marijuana Use

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The latest report from the National Survey on Drug Use and Health shows that rates of marijuana use in the past month among 12- to 17-year-olds decreased by 0.5% between 2015 and 2016.<sup>1</sup> Supporters of marijuana legalization have interpreted these new data to strengthen the claim that legalization is not associated with increases in adolescent marijuana use.<sup>2</sup> Data from large, national studies are important but offer only a single, narrow view of the big picture.

We now have more than 4 decades of national survey data showing shifts in the patterns of adolescent substance use over time. Data from the Monitoring the Future survey illustrate that the proportion of students who report no lifetime use of alcohol, tobacco, or marijuana has steadily increased from a low of 2.9% who denied any use in 1983 to 25% in 2013.<sup>3</sup> This enormous and largely unnoticed public health success represents a cultural shift away from substance use overall. That is the good news.

In the 1980s, the rates of student use of alcohol, tobacco, and marijuana were all decreasing.<sup>4</sup> Then, in the mid-1990s, the trend toward marijuana use flattened right around the time that California became the first state to legalize marijuana for medical use, and the perception of harm began to drop. For the past 20 years, rates of alcohol and tobacco use have continued to decline, with marijuana being an outlier among these 3 commonly used substances.

In this issue of *Pediatrics*, Miech et al<sup>5</sup> offer interesting insights as to why

rates of marijuana use have not been increasing, although the perception of harm has been decreasing steadily. The key insight they offer is that tobacco, alcohol, and marijuana use go together; students who use 1 are much more likely to use either of the other 2. By extrapolating from 25 years of data from the Monitoring the Future survey and stratifying students into groups by cigarette smoking and alcohol use status to control for high-risk behavior, the authors found that each separate group showed a significant increase in rates of marijuana use. In other words, both high-risk and low-risk students increased their use of marijuana, but there are fewer high-risk students now. The 2 changes are in opposite directions, and as a result, marijuana use rates have remained relatively flat and even decreased minimally by some measures this year.<sup>1</sup> Changing policy is indeed having an impact, but we have not seen big increases in adolescent marijuana use rates because other cultural forces are tempering them to an extent. Perhaps the clearest example of the impact of marijuana legalization is in Colorado, where the number of adolescent users increased by 20% in the 2 years immediately after legalization, whereas rates fell by 4% nationally.<sup>6</sup> This finding also demonstrates the limitations of analyzing data that have been averaged nationally.

Another concern is that evolving marijuana policies have resulted in changes to cannabis itself.<sup>7</sup> The concentration of tetrahydrocannabinol in cannabis (its main active ingredient) has increased dramatically over the past 3 decades,<sup>8</sup> exposing users

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to higher levels of this drug than ever before. As the perception of marijuana has softened, the number of daily marijuana users has skyrocketed.<sup>9</sup> New edible products laced with cannabinoids, including cookies, candies, and sodas, have appeared on the market and are being sold under the umbrella of “marijuana.” This market expansion is to be expected because creating new and improved products is an established technique for boosting sales by constantly inviting new users to try and old users to add new products to their repertoires. As the perceived risk of harm and the bar to trying these edible products falls, the greater the danger they pose.

In our clinical practice, the fluctuating strength and formulations of tetrahydrocannabinol-based products are changing the presentation of marijuana use disorders. Cannabis hyperemesis syndrome,<sup>10</sup> which was once rare, is now common among our patients. Psychiatric symptoms and complaints, including hallucinations, paranoia, and delusions, have also increased. As pediatricians and addiction medicine specialists, we find these trends terrifying and fear that we are only at the beginning of this experiment.

Dropping perceptions of harm arise from the misconceptions that marijuana is “healthy because it is natural” or “safe because it is legal.” Both of these ideas are false; cannabis is well known to be particularly detrimental to the

developing adolescent brain. Public health campaigns that correct these misimpressions should be used to counterbalance messaging from the growing marijuana industry. Medical professionals are uniquely positioned to provide guidance to youth about the risks of substance use. Amid the highs and lows of national survey data, 1 message should be unambiguous: avoiding marijuana use during the adolescent and young adult years is best for health.

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