



COLORADO

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health watch

March 2015 No. 95

Marijuana Use Among Adolescents in Colorado: Results from the 2013 Healthy Kids Colorado Survey

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Background

Beginning in 2000, medical marijuana use in Colorado was decriminalized for individuals diagnosed with specific debilitating conditions.¹ Over a decade later, in 2012, Colorado became one of the first two states in the U.S. to legalize retail sale of marijuana for nonmedical use by those 21 years of age and older.² As of May 2014, a total of 20 states and the District of Columbia had legalized medical marijuana while only two states had legalized both medical and retail marijuana; although, these numbers are expected to rise as more states continue to introduce legislation to decriminalize or permit marijuana use in some form.³ Public health officials in collaboration with other health professionals are closely monitoring the patterns of use, particularly among adolescents and youth for whom marijuana use is illegal, and who might be at a greater risk of adverse physical and mental health outcomes than adult marijuana users. A growing body of literature suggests certain areas of the brain continue to develop well into a person's twenties and that adolescent use of substances, including marijuana, might have lasting effects on key functions such as memory and learning.⁴

The monitoring of adolescent marijuana use is essential to reducing and mitigating the risks associated with marijuana use in this age group by informing public health programs and outreach. Primarily, population-based surveys are used to monitor the prevalence of marijuana use over time. For example, the Center for Disease Control and Prevention's (CDC) Youth Risk Behavior Survey (YRBS) and Colorado's Healthy Kids Colorado Survey (HKCS) both include a representative sample of middle school and high school students at the state and national levels.^{5,6} These surveys include a range of health and behavior topics specific to adolescents and include questions about marijuana use initiation, ever use and past 30 day use.⁵

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Using data from the YRBS and HKCS, this report investigates patterns of marijuana use among Colorado middle school and high school students over time and by demographic characteristics. The prevalence of marijuana use in Colorado is also compared to national marijuana use and use in other states.

Methods

Data sources

Data on adolescent marijuana use are collected from Colorado middle school students (grades 6-8) and high school students (grades 9-12) in odd-numbered years. Historically, this has been through participation in the CDC's Youth Risk Behavior Survey (YRBS). Colorado has participated in the high school survey since 1991 and joined the middle school survey in 2011. YRBS employs a two-stage cluster sampling design of 6-12 graders in public schools. However, sample sizes are small and do not always achieve the 60 percent response rate necessary to produce prevalence estimates representative of the larger student population in Colorado.

Colorado implemented the Healthy Kids Colorado Survey (HKCS) in the fall of 2013. HKCS includes components of YRBS, namely an overlapping set of core questions. However, the sampling design was modified for HKCS by stratifying the sample by Colorado's 21 health statistics regions. HKCS also includes charter schools in the sampling frame.

A total of 14,187 middle school students and 25,197 high school students completed the 2013 HKCS, resulting in representative data for Colorado that can also be stratified by various demographic characteristics. For the first time ever, regional prevalence estimates are available for students in grades 7-12.

The data source for prevalence estimates for the nation and neighboring states is the 2013 YRBS. National (U.S.) prevalence estimates include data from 47 states and five territories with data available.

Definitions

Marijuana use was evaluated using affirmative responses to three questions that appear on both HKCS and YRBS; with the exception of middle school student, past 30-day use which only appears on the states' 2013 HKCS.

Ever use: "During your life, how many times have you used marijuana?"

Past 30-day use: "During the past 30 days, how many times did you use marijuana?"

Age of first use: "How old were you when you tried marijuana for the first time?"

Statistical analyses

The data were weighted to account for the probability of student selection and to reduce bias by adjusting for differing patterns of nonresponse. These adjustments allow for the generalization of findings to the middle and high school student populations of Colorado.

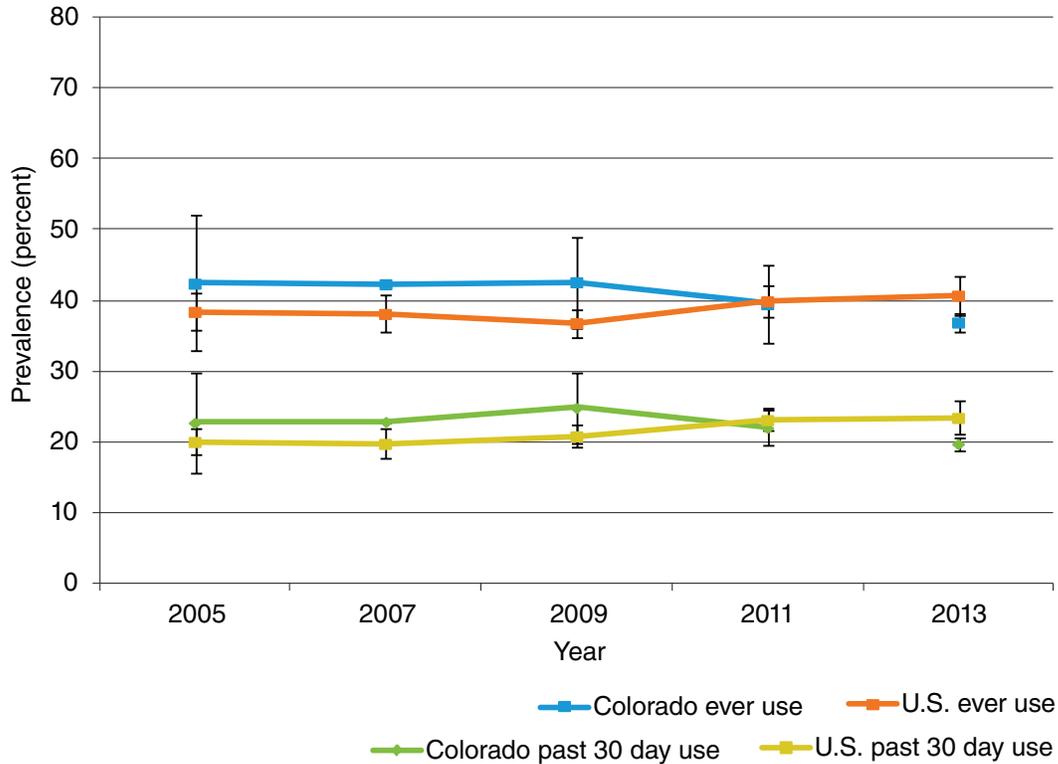
Descriptive statistics were calculated to determine the prevalence and 95 percent confidence intervals for each variable of interest. Statistical analyses were performed using SAS 9.3 (SAS Institute Inc., Cary, North Carolina). Statistical significance was evaluated among 2013 estimates using 95 percent confidence intervals. If the confidence intervals surrounding two estimates did not overlap, the difference in prevalence is considered statistically significant.

For the purposes of describing patterns of adolescent marijuana use in Colorado, comparisons are made with previous years of YRBS data and YRBS data from surrounding states. However, such comparisons are only intended to be general observations and statistically significant differences between years or geographies cannot be inferred. Data from HKCS and YRBS are not considered to be directly comparable, due primarily to the differences in sampling methodology.

Results

Colorado’s Healthy Kids Colorado Survey (HKCS) includes a statewide, representative sample of nearly 40,000 high school and middle school students.

Figure 1. Marijuana use among high school students, U.S.^a and Colorado,^b 2005–2013.^c



a. U.S.: 2005-2013 YRBS prevalence estimates.

b. Colorado: 2005-2011 YRBS prevalence estimates and 2013 HKCS prevalence estimates.

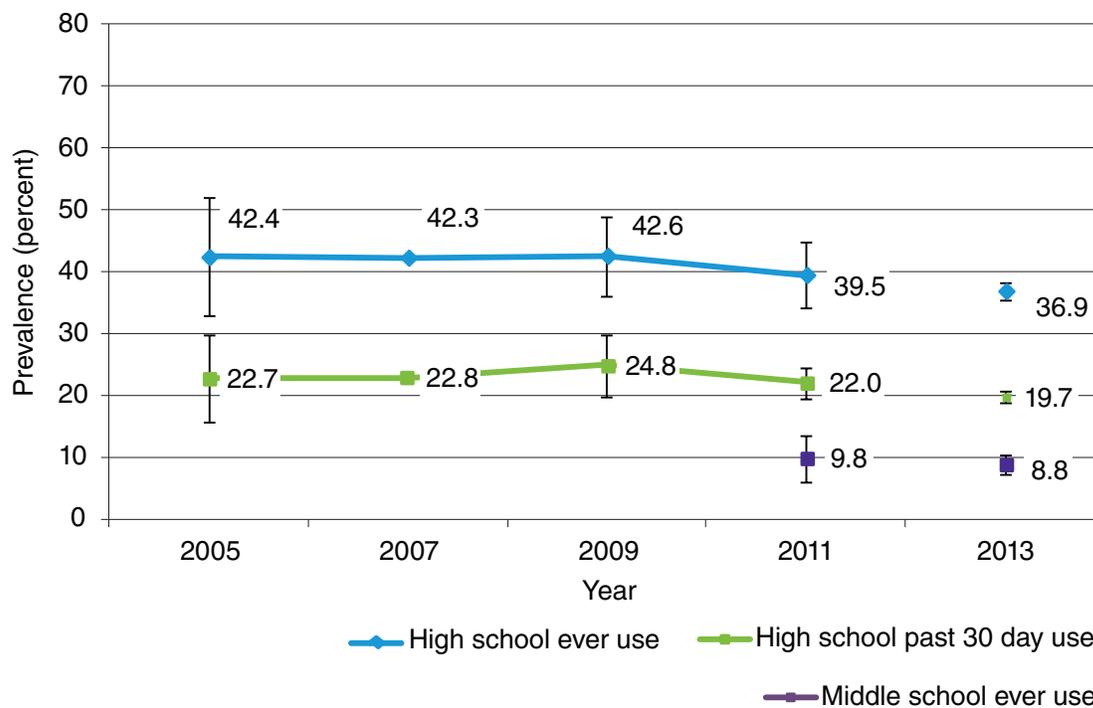
c. The 2007 estimates for Colorado are unweighted due to a lower response rate and therefore do not have confidence intervals.

Over the past several years, the prevalence of marijuana use in Colorado has closely followed the national trends (Figure 1). For example, in 2013, 40.7 percent (37.9, 43.5) of U.S. high school students reported ever using marijuana while 36.9 percent (35.4, 38.3) of Colorado high school students reported ever using marijuana. Similarly, 23.4 percent (21.3, 25.7) of U.S. high school students had used marijuana in the past 30 days compared with 19.7 percent (18.7, 20.6) of Colorado high school students.

For contextual purposes utilizing the YRBS estimates, marijuana use in Colorado can be compared with neighboring states including Nebraska, New Mexico, Oklahoma, Kansas, Utah, Arizona and Wyoming. In 2013, prevalence of past 30-day use marijuana use among high school students was highest in New Mexico (27.8%) followed by Arizona (23.5%), Colorado (19.7%), Wyoming (17.8%), Oklahoma (16.3%), Kansas (14.3%), Nebraska (11.7%) and Utah (7.6%).⁶ Prevalence of reported ever use of marijuana among high school students in 2013 ranged from a high of 43.3 percent in Arizona to a low of 16.8 percent in Utah; the prevalence was 36.9 percent in Colorado.⁶

In Colorado, the trends in ever use and past 30-day use of marijuana among high school students have remained stable over time (Figure 2). Due to changes in survey methodology trends in marijuana use should be interpreted with caution. In a trend analysis of historical data, there was not a significant trend (increase or decrease) or change in high school marijuana use patterns between 2009 and 2011.⁵

Figure 2. Marijuana use among students, Colorado, 2005–2013.^{a-c}



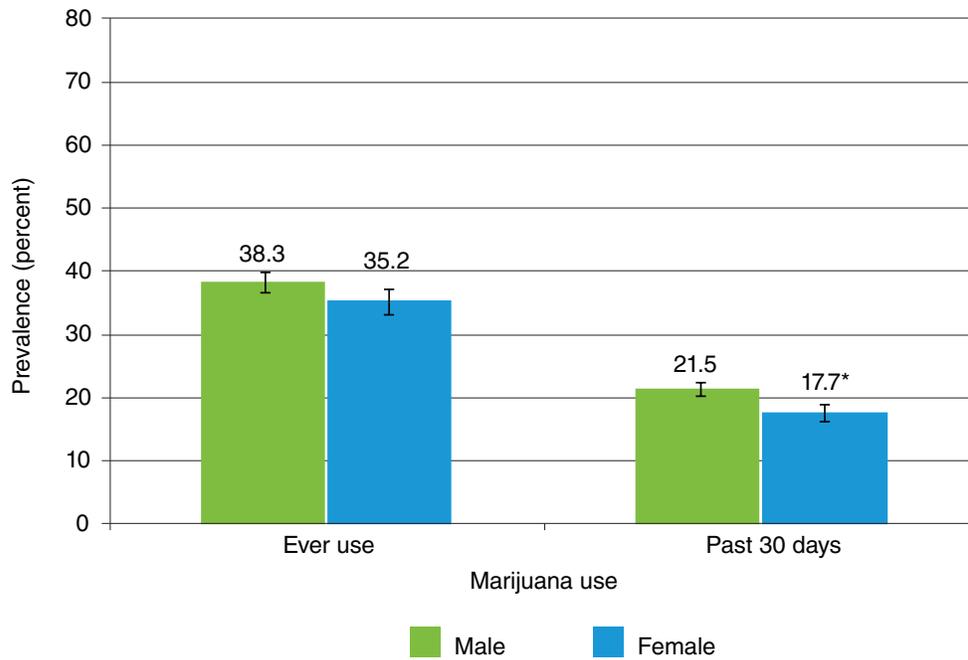
- a. Middle school past 30-day use only collected in 2013 HKCS (data not shown).
- b. Colorado: 2005–2011 YRBS prevalence estimates and 2013 HKCS prevalence estimates.
- c. The 2007 estimates are unweighted due to a lower response rate and therefore do not have confidence intervals.

Descriptive analyses for 2013 HKCS data for Colorado high school (grades 9-12) and middle school (grades 6-8) students

Ever and past 30-day marijuana use

In Colorado, approximately 37 percent of high school students reported ever using marijuana and nearly 20 percent used in the past 30 days. Marijuana use among younger students was lower; with 5.1 percent of Colorado middle school students reporting past 30-day use and 8.8 percent having ever used marijuana. Marijuana use significantly varied by sex, grade, and race/ethnicity. Male high school students had a significantly higher prevalence of past 30-day marijuana use compared with female students, but there were no significant differences in ever use of marijuana between males and females (Figure 3).

Figure 3. Ever and past 30-day use of marijuana among high school students by sex, Colorado, 2013.

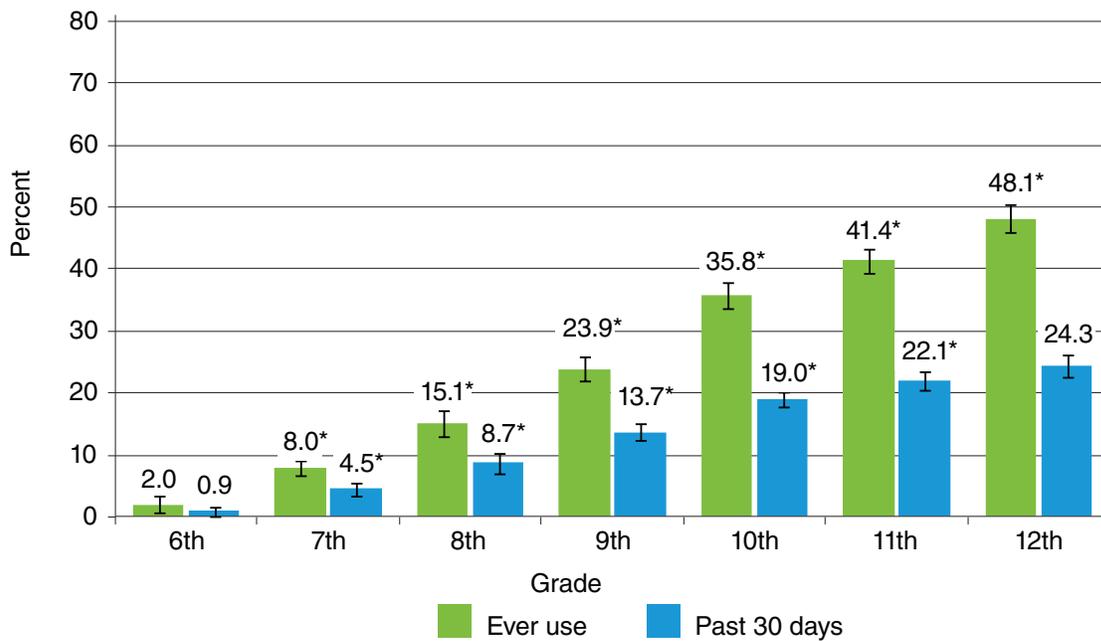


Data source: Healthy Kids Colorado Survey (HKCS) 2013.

*indicates significantly higher than comparison group.

The prevalence of high school and middle school students ever using marijuana increased significantly with each advance in grade (Figure 4). The same pattern was observed in these populations for past 30-day use.

Figure 4. Ever and past 30-day use of marijuana among high school and middle school students by grade, Colorado, 2013.

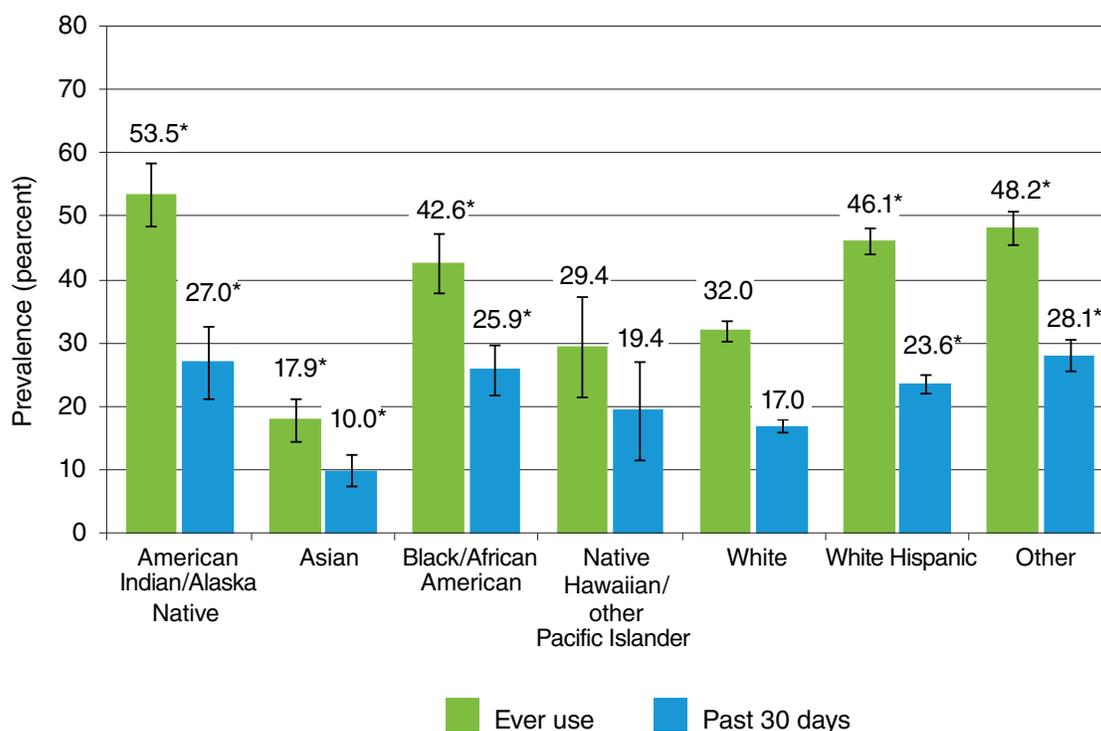


Data source: Healthy Kids Colorado Survey (HKCS) 2013.

*indicates significant increase in prevalence of marijuana use between grades.

Ever and past 30-day use of marijuana among high school students varied significantly by race/ethnicity (Figure 5). High school students that self-identified as American Indian or Alaska Native, Black or African American, White Hispanic and “other” races reported a higher prevalence of ever use and use in the past 30 days compared with White high school students. Ever use and use in the past 30 days was significantly lower among Asian students compared with White students.

Figure 5. Ever and past 30-day use of marijuana among high school students by race/ethnicity, Colorado, 2013.



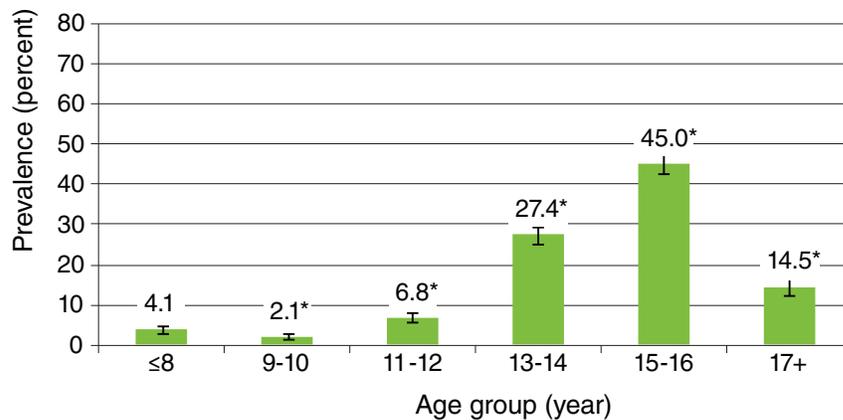
Data source: Healthy Kids Colorado Survey (HKCS) 2013.

*indicates significantly higher/lower than White high school students.

Age of first marijuana use

A total of 8.1 percent of high school students reported their first use was before their 13th birthday. Significantly more male (9.9%) high school students reported having tried marijuana before age 13 compared with female (6.1%) students. Nearly half (45%) of high school seniors who ever used marijuana reported their age at first use to be between 15 and 16 years old (Figure 6, see next page). Among middle school students, 2 percent reported use of marijuana before age 11.

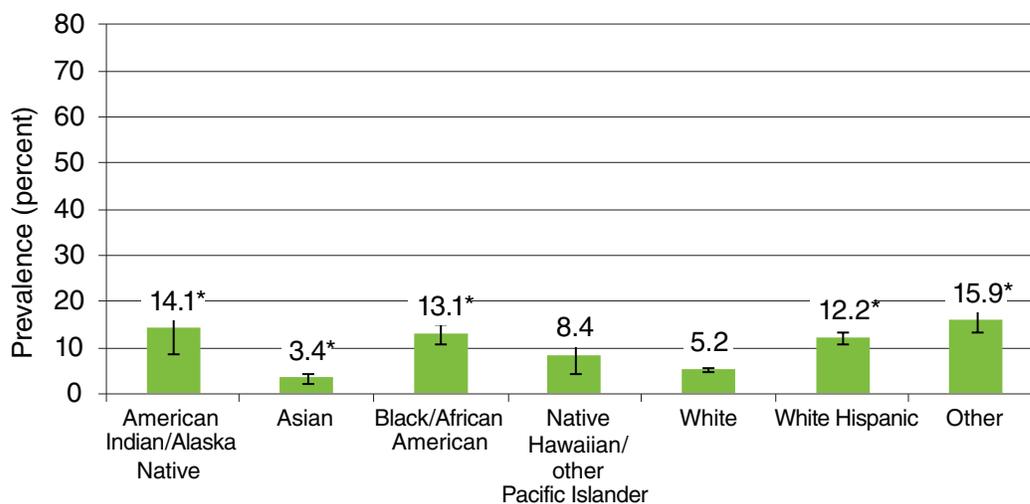
Figure 6. Age of first use, high school seniors (12th grade) who reported ever using marijuana, Colorado, 2013.



Data source: Healthy Kids Colorado Survey (HKCS) 2013.
 *indicates a significant increase/decrease between age groups.

Significant racial and ethnic disparities exist among high school students reporting they tried marijuana before age 13 (Figure 7). A greater percentage of high school students self-identifying as American Indian or Alaska Native, Black or African American, White Hispanic and Other race reported trying marijuana before age 13 compared with White students. Significantly fewer Asian students reported trying marijuana before age 13 compared with White students.

Figure 7. Marijuana use before age 13 by race/ethnicity, high school students, Colorado, 2013.

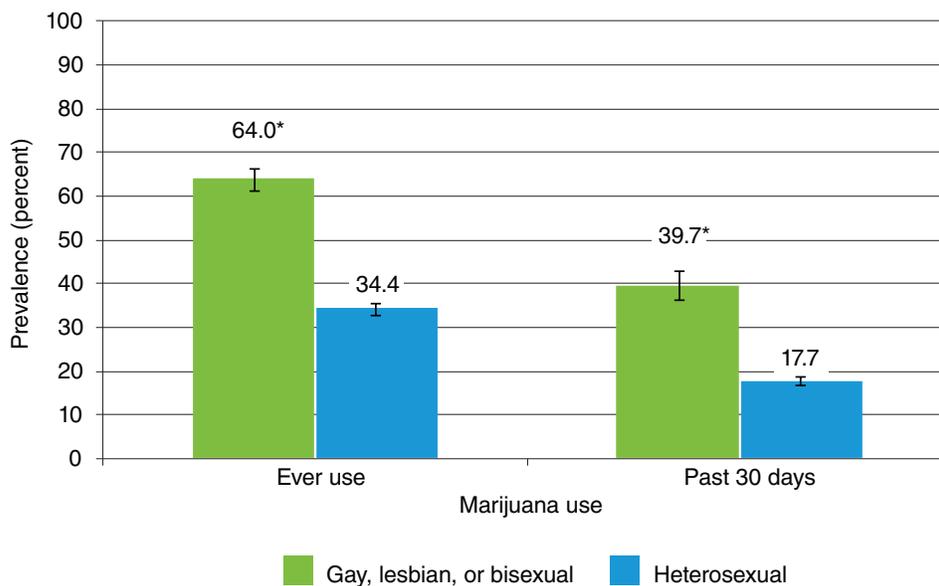


Data source: Healthy Kids Colorado Survey (HKCS) 2013.
 *indicates significantly higher/lower than White high school students.

Marijuana use by sexual orientation

Prevalence of ever and past 30-day use of marijuana was significantly higher among gay, lesbian or bisexual (GLB) high school students compared with heterosexual students (Figure 8). A significantly greater percentage of GLB high school students reported trying marijuana before age 13 (19.9%) compared with heterosexual high school students (6.4%) (data not shown).

Figure 8. Ever and past 30-day use of marijuana by sexual orientation, Colorado, high school students, 2013.



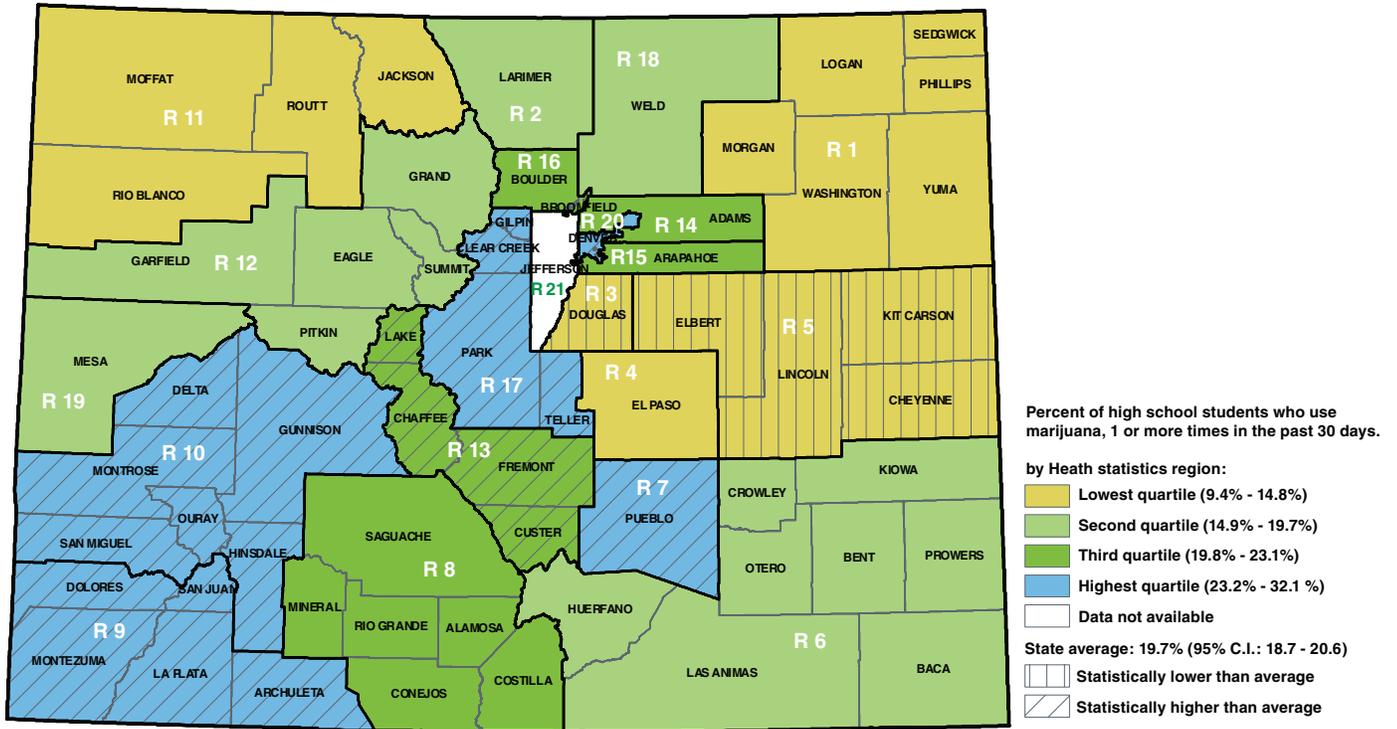
Data source: Healthy Kids Colorado Survey (HKCS) 2013.

*indicates significantly higher than comparison group.

Marijuana use in the past 30 days by geographic region of Colorado

The prevalence of marijuana use in the past 30 days among high school students varied significantly across Colorado (Figure 9). In general, prevalence of past 30-day use of marijuana among high school students was highest in select central and southwestern regions of the state.

Figure 9. Past 30-day marijuana use by region, Colorado, high school students, 2013.



Data source: Healthy Kids Colorado Survey (HKCS) 2013.

Discussion

Describing and monitoring the potential impacts of the legalization of retail marijuana on marijuana use among adolescents are a public health priority in Colorado. Since the changes in legislation are recent, it is not yet clear how and if the legalization of retail marijuana use for adults will affect retail marijuana use among adolescents. Notably, trends in the prevalence of marijuana use among Colorado high school students mimic the national trends and are comparable with surrounding states. There are significant differences in high school students' marijuana use patterns including; age at first use, ever and past 30-day use by geographic region of residence, sex, race/ethnicity, sexual orientation and grade/age. Marijuana use was found to often be initiated in middle school or the first year of high school (ages 13-16 years). Particularly, ever and past 30-day use is much less prevalent among the younger middle school students. This information can be used to target public health interventions to prevent marijuana use among adolescents before it starts, and to identify target populations for cessation programs.

Limitations

The survey data presented in this report have several limitations and details of these limitations can be found in a Center for Disease Control (CDC), Morbidity and Mortality Weekly Report (MMWR) found here: <http://www.cdc.gov/mmwr/PDF/rr/rr5312.pdf>.

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Acknowledgment

This report was supported in part by an appointment to the Applied Epidemiology Fellowship Program administered by the Council of State and Territorial Epidemiologists (CSTE) and funded by the Centers for Disease Control and Prevention (CDC) Cooperative Agreement Number 1U38OT000143-02.