Monitoring Health Concerns Related to Marijuana in Colorado: 2016

Executive Summary

Retail Marijuana Public Health Advisory Committee

COLORADO
Department of Public Health & Environment

Retail Marijuana Public Health Advisory Committee Members 2015-2016

Chairman: Mike Van Dyke, PhD, CIH, Chief, Environmental Epidemiology, Occupational Health and Toxicology Branch

Laura Borgelt, PharmD, Associate Dean and Professor, Departments of Clinical Pharmacy and Family Medicine, University of Colorado Anschutz Medical Campus

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Heath Harmon, MPH, Director of Health Divisions, Boulder County Public Health

Sharon Langendoerfer MD, Retired Pediatrician and Neonatologist, Denver Health Medical Center

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Judith Shlay, MD, MSPH, Interim Director, Denver Public Health; Professor of Family Medicine, University of Colorado School of Medicine

George Sam Wang, MD, Assistant Professor of Pediatrics, Department of Pediatrics, Section of Emergency Medicine and Medical Toxicology, University of Colorado Anschutz Medical Campus and Children's Hospital Colorado; Volunteer Faculty, Rocky Mountain Poison and Drug Center

Rebecca Helfand, PhD, Director of Data and Evaluation, Office of Behavioral Health, Colorado Department of Human Services

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Tista Ghosh, MD, MPH, Deputy Chief Medical Officer and Director of Health Programs, Colorado Department of Public Health and Environment (Alternate Member)

Introduction

When Colorado became one of the first two states in the nation to legalize retail marijuana, the Colorado Legislature mandated that the Colorado Department of Public Health and Environment (CDPHE) study the potential public health effects of marijuana. Though medical marijuana has been legal in Colorado since 2000, it was largely viewed as an individual doctor/patient decision outside the scope of public health policy. However, the legalization of retail (non-medical) marijuana and the potential for greater availability of marijuana in the community prompted a closer look at potential health effects on the population at large.

Legalized retail marijuana presents a paradigm shift, grouping marijuana with other legal substances like alcohol, tobacco and prescription drugs, as opposed to illicit drugs like cocaine and heroin. As with alcohol, tobacco and prescription drugs, misuse of marijuana can have serious health consequences. The standard public health approaches to alcohol, tobacco and prescription drugs are to monitor use patterns and behaviors, health care use, potential health effects, and emerging scientific literature to guide the development of policies or consumer education strategies to prevent serious health consequences. This report presents information on marijuana use patterns, potential health effects and the most recent scientific findings associated with marijuana use, with a key objective of helping facilitate evidence-based policy decisions and science-based public education campaigns.

In 25-1.5-110, C.R.S., the Colorado Department of Public Health and Environment (CDPHE) was given statutory responsibility to:

- "... monitor changes in drug use patterns, broken down by county and race and ethnicity, and the emerging science and medical information relevant to the health effects associated with marijuana use."
- "... appoint a panel of health care professionals with expertise in cannabinoid physiology to monitor the relevant information."
- "... collect Colorado-specific data that reports adverse health events involving marijuana use from the all-payer claims database, hospital discharge data, and behavioral risk factors."

Based on this charge, CDPHE has appointed a 14-member committee, the Retail Marijuana Public Health Advisory Committee (RMPHAC), to review scientific literature on the health effects of marijuana and Colorado-specific health outcome and use pattern data. Members of this committee (see Retail Marijuana Public Health Advisory Committee membership roster) consist of individuals in the fields of public health, medicine, epidemiology and medical toxicology who demonstrate expertise related to marijuana through their work, training or research. This committee was charged with the duties as outlined in C.R.S. 25-1.5-110 to "... establish criteria for studies to be reviewed, reviewing studies and other data, and making recommendations, as appropriate, for policies intended to protect consumers of marijuana or marijuana products and the general public." The committee began meeting in May 2014 and in January 2015 published the first edition of this report. The overall goal of the committee was to implement an unbiased and transparent process for evaluating scientific literature as well as marijuana use and health outcome data. The committee was particularly interested in ensuring quality information is shared about the known physical and mental health effects associated with marijuana use - and also about what is unknown at present. The official committee bylaws are included in the Appendix, Retail Marijuana Public Health Advisory Committee Bylaws.

Monitoring changes in marijuana use patterns

This report includes detailed information about marijuana use patterns in Colorado that has been gathered using several prominent population-based surveys. These surveys are:

1. The Behavioral Risk Factor Surveillance System survey, a survey of adults sponsored by the U.S. Centers for Disease Control and Prevention (CDC).
2. The Child Health Survey, a survey of adults with children ages 1-14 years old in their home about the children's health and environment.
3. The Healthy Kids Colorado Survey of middle and high school students, a collaboration of CDPHE, Colorado Department of Education, and Colorado Department of Human Services.
4. The Pregnancy Risk Assessment Monitoring System survey, a survey of women who recently gave birth.

The data available at this time cannot answer all of the important questions about whether or how marijuana use patterns may be changing as a result of legalization. However, they do provide important insights into marijuana use in adults and vulnerable populations such as pregnant women, youth, and those with racial, ethnic, and sexual orientation disparities. A summary of key trends:

Encouraging trends

- For adults and adolescents, past-month marijuana use has not changed since legalization either in terms of the number of people using or the frequency of use among users.
- Based on the most comprehensive data available, past month marijuana use among Colorado adolescents is nearly identical to the national average.
- We have not identified any new disparities in marijuana use by age, gender, race, ethnicity or sexual orientation since legalization.
- Daily or near-daily marijuana use among adults is much lower than daily or near-daily alcohol or tobacco use. Among adolescents, past month marijuana use is lower than past month alcohol use.

Trends to continue monitoring

- About 6 percent of pregnant women use marijuana while pregnant. This percentage is higher among those with unintended pregnancies as well as younger mothers or those with less education.
- At least 14,000 children in Colorado are at risk of accidentally eating marijuana products that are not safely stored and at least 16,000 are at risk of being exposed to secondhand marijuana smoke in the home.
- More than 5 percent of high school students use marijuana daily or near daily. This rate has remained stable since at least 2005.
- Past month marijuana use among adults in Colorado is higher than the national average. In Colorado, one in four adults age 18-25 reported past month marijuana use and one in eight use daily or near-daily. These numbers have been consistent since legalization.
- There continue to be disparities in marijuana use based on race/ethnicity for adolescents and sexual orientation for both adults and adolescents.
- While past month marijuana use among adults and adolescents was stable for most regions in Colorado, adult use in the Northwest Colorado region increased from 2014 to 2015.
- More than 1-in-3 adolescents who use marijuana first use it by age 14, supporting prevention efforts aimed at children before they enter ninth grade.

Scientific literature review on potential health effects of marijuana use

The committee used a standardized systematic literature review process to search and grade the existing scientific literature on health effects of marijuana. Findings were synthesized into evidence statements that summarize the quantity and quality of supporting scientific evidence. These evidence statements were classified as follows:

- Substantial evidence - indicates robust scientific findings that support an association between marijuana use and the outcome.
- Moderate evidence - indicates that scientific findings support an association between marijuana use and the outcome, but these findings have some limitations.
- Limited evidence - indicates modest scientific findings that support an association between marijuana use and the outcome, but these findings have significant limitations.
- Mixed evidence - indicates both supporting and non-supporting scientific findings for an association between marijuana use and the outcome with neither direction dominating.
- Body of research failing to show an association - indicates that the topic has been researched without evidence of an association; is further classified as a limited, moderate or substantial body of research.
- Insufficient evidence - indicates that the outcome has not been sufficiently studied to conclude whether or not there is an association between marijuana use and the outcome.

The committee also translated these evidence statements into plain language so the public can understand them when used in public health messages. In addition, the committee was asked to develop public health recommendations based on potential concerns identified through the review process and to articulate research gaps based on common limitations of existing research. All of these were presented to the full committee during open public meetings that offered opportunities for stakeholder input. Final statements, recommendations, and research gaps were formally approved by a majority vote of the committee.

An important note for all key findings is that the available research evaluated the **association** between marijuana use and potential adverse health outcomes. This **association** does not prove the marijuana use alone **caused** the effect. Despite the best efforts of researchers to account for confounding factors, there may be other important factors related to **causality** that were not identified. In addition, marijuana use was illegal everywhere in the United States prior to 1996. Research funding, when appropriated, was commonly sought to identify adverse effects from marijuana use. This legal fact introduces both funding bias and publication bias into the body of literature related to marijuana use. Another limitation of the available research data is that most studies did not or could not measure the THC level (potency) of marijuana used by subjects, nor which other cannabinoids were present. There are diverse products now available in Colorado, many of which are likely higher in potency than the marijuana used by study subjects for much of the literature reviewed.

The Retail Marijuana Public Health Advisory Committee recognizes the limitations and biases inherent in the published literature and made efforts to ensure the information reviewed and synthesized is reflective of the current state of medical knowledge. Where information was lacking - for whatever reason - the committee identified this knowledge gap and recommended further research. This information will be updated as new research becomes available.

Marijuana use among adolescents and young adults

The committee reviewed the relationships between adolescent and young adult marijuana use and cognitive abilities, academic performance, mental health and future substance use. Weekly marijuana use by adolescents is associated with impaired learning, memory, math and reading, even 28 days after last use. Weekly use is also associated with failure to graduate from high school. Adolescents and young adults who use marijuana are more likely to experience psychotic symptoms as adults, such as hallucinations, paranoia, delusional beliefs and feeling emotionally unresponsive. Evidence shows that marijuana users can become addicted to marijuana and that treatment for marijuana addiction can decrease use and dependence. Additionally, marijuana users who quit have lower risks of cognitive and mental health outcomes than those who continue to use.

Marijuana use and cancer

The committee reviewed different forms of cancer relative to marijuana use, as well as the chemicals released in marijuana smoke and vapor. Strong evidence shows that marijuana smoke contains many of the same cancer-causing chemicals found in tobacco smoke. However, there is conflicting research for whether or not a higher cumulative level of marijuana smoking is associated with lung cancer. Limited evidence suggests an association between marijuana use and both testicular and prostate cancers. On the other hand, the limited evidence available concerning cancers of the bladder, head and neck suggests that they might not have any association with marijuana use.

Marijuana use and cardiovascular effects

The committee reviewed myocardial infarction, stroke and death from cardiovascular causes, relative to marijuana use. There is a moderate level of scientific evidence that marijuana use increases risk for some forms of stroke in individuals younger than 55 years of age, and more limited evidence that marijuana use may increase risk for heart attack. Research is lacking concerning other cardiovascular events and conditions, including death.

Marijuana dose and drug interactions

The committee reviewed THC (tetrahydrocannabinol, the main psychoactive component of marijuana) levels relative to marijuana dose and method of use, the effects of secondhand marijuana smoke, drug-drug interactions involving marijuana, and relationships between marijuana and opioid use. One very important finding is that it can take up to four hours after consuming an edible marijuana product to reach the peak THC blood concentration and feel the full effects. There is credible evidence of clinically important drug-drug interactions between marijuana and multiple medications, including some anti-seizure medications and a common blood-thinner. Data about potential interactions are lacking for many drugs at this time and likely to evolve substantially over coming years. Finally, there is some evidence that opioid pain medication overdose deaths are lower in states with legal medical marijuana than would be expected based on trends in states without legal medical marijuana. There is conflicting evidence for whether or not marijuana use is associated with a decrease in opioid use among chronic pain patients or individuals with a history of problem drug use.

Marijuana use and driving

The committee reviewed driving impairment and motor vehicle crash risk relative to marijuana use, as well as evidence indicating how long it takes for impairment to resolve after marijuana use. They found that the risk of a motor vehicle crash increases among drivers with recent marijuana use. Furthermore, the higher the blood THC level, the higher the motor vehicle crash risk. In addition, using alcohol and marijuana together increases impairment and the risk of a motor vehicle crash more than using either substance alone. For less than weekly marijuana users, using marijuana containing 10 milligrams or more of THC is likely to impair the ability to safely drive, bike, or perform other safety-sensitive activities. Less than weekly users should wait at least six hours after smoking or eight hours after eating or drinking marijuana to allow time for impairment to resolve.

Marijuana use and gastrointestinal or reproductive effects

The committee reviewed gastrointestinal diseases, particularly cyclic vomiting, and infertility or abnormal reproductive function. Evidence shows that long-time, daily or near daily marijuana use is associated with cyclic vomiting, which has been called cannabinoid hyperemesis syndrome. In such cases, stopping marijuana use may relieve the vomiting. There is conflicting research for whether or not marijuana use is associated with male infertility or abnormal reproductive function, and research is lacking on female reproductive function related to marijuana use.

Marijuana use and injury

The committee reviewed workplace, recreational and other non-driving injuries, burns from hash-oil extraction or failed electronic smoking devices, and physical dating violence. Evidence shows that marijuana use may increase the risk of workplace injury while impaired, but is unclear for other types of non-driving related injury. There have been many reports of severe burns resulting from home-extraction of butane hash-oil leading to explosions, and cases of electronic smoking devices exploding, leading to trauma and burns. Concerning dating violence, adolescent girls who use marijuana may be more likely to commit physical violence against their dating partners, and adolescent boys who use marijuana may be more likely to be victims of physical dating violence.

Marijuana use and neurological, cognitive and mental health effects

The committee reviewed the potential relationships between marijuana use and cognitive impairment, mental health disorders and substance abuse. Strong evidence shows that daily or near daily marijuana users are more likely to have impaired memory lasting a week or more after quitting. An important acute effect of THC is psychotic symptoms, such as hallucinations, paranoia and delusional beliefs during intoxication. These symptoms are worse with higher doses. Daily or near daily marijuana use is associated with developing a psychotic disorder such as schizophrenia. Finally, evidence shows that marijuana users can become addicted to marijuana and that treatment for marijuana addiction can decrease use and dependence.

Marijuana use during pregnancy and breastfeeding

The committee reviewed adverse birth outcomes, effects of prenatal marijuana use on exposed offspring later in childhood or adolescence and effects of marijuana use by a breastfeeding mother. Biological evidence shows that THC passes through the placenta to the fetus, so that the unborn child is exposed to THC if the mother uses marijuana, and that THC passes through breast milk to a breastfeeding child. Marijuana use during pregnancy may be associated with an increased risk of heart defects or stillbirth. Stronger evidence was found for effects that are seen months or years after birth if a child's mother used marijuana while pregnant with the child. These include decreased growth and impaired cognitive function and attention. Decreased academic ability or increased depression symptoms may also occur.

Marijuana use and respiratory effects

The committee reviewed respiratory diseases like chronic obstructive pulmonary disorder (COPD), chronic bronchitis and asthma, respiratory infections and lung function relative to smoked marijuana. They also reviewed potential health effects of vaporized marijuana. Strong evidence shows an association between daily or near-daily marijuana use and chronic bronchitis. Additionally, daily or near daily marijuana use may be associated with bullous lung disease and pneumothorax in individuals younger than 40 years of age. Research is lacking concerning any possible association between marijuana use and COPD, emphysema or respiratory infections. Smokers who switch from marijuana smoking to marijuana vaporizing may have fewer respiratory symptoms and improved pulmonary function. Finally, a notable effect of acute use is a short-term improvement in lung airflow.

Unintentional marijuana exposures in children

The committee reviewed unintentional marijuana exposure relative to marijuana legalization and child-resistant packaging. They found strong evidence that more unintentional marijuana exposures of children occur in states with increased legal access to marijuana, and that the exposures can lead to significant clinical effects requiring hospitalization. Additionally, evidence shows that child resistant packaging prevents exposure to children from potentially harmful substances, such as THC.

Monitoring possible marijuana-related health effects

This report includes detailed information about population-based health effects of legalized marijuana in Colorado, using two primary public health datasets:

1. Exposure calls to the Rocky Mountain Poison and Drug Center, typically used as a surrogate data source to determine the potential for adverse health effects from exposure to chemicals and drugs.
2. Hospital and emergency department data provided by the Colorado Hospital Association, which collects data from participating hospitals in the state of Colorado.

The data presented here provide important insights into the yearly volume, trends over time and nature of marijuana exposure calls to the poison center among different age groups and the rates of hospitalizations and emergency department visits for which a marijuana-related billing code was used. A summary of key trends:

Encouraging trends

- Marijuana exposure calls to the poison center appear to be decreasing since 2015, including unintentional exposures in children ages 0-8 years.
- The overall rate of emergency department visits with marijuana-related billing codes dropped 27 percent from 2014 to 2015 (2016 data is not available yet).

Trends to continue monitoring

- Marijuana exposure calls to the poison center continue to be higher in years after medical marijuana commercialization (2010-2016) than in previous years (2000-2009), including calls about children 0-8 years old with unintentional marijuana exposure.
- Edible marijuana products were involved in about 40 percent of marijuana exposure calls to the poison center. For children 0-8 years old, calls about edible marijuana were twice as common as calls about smokeable marijuana.
- The overall rate of hospitalizations with marijuana-related billing codes has increased each year since 2008.

- Among young adults (ages 18-25 years) in 2014 and 2015, about 8 percent of all hospitalizations and 2 percent of all emergency department visits had a marijuana-related billing code. This was higher than the rate among other age groups, and likely reflects the higher rate of marijuana use in this age group.
- Disparities in hospitalizations and emergency department visits also existed by sex and race, with higher rates among males and blacks across all time periods.
- Hospitalizations with marijuana-related billing codes are nine times more likely to have a primary mental health diagnosis compared to those without marijuana-related billing codes.

These data should be interpreted carefully, keeping in mind that observed increases have many potential explanations including: changes in the amount or type of marijuana use in Colorado, changes in physician screening or reporting related to marijuana, increased honesty in reporting marijuana use to health care providers after legalization, and changes in coding practices by hospitals and emergency departments. In addition, possible marijuana-related cases accounted for 3 percent of hospitalizations and less than 1 percent of emergency department visits in Colorado in 2015. More data and time are needed to determine if the observed increases are a direct and sustained result of changes in Colorado marijuana use.

Public health recommendations

The committee made a number of public health recommendations interspersed throughout this report. It recommends Colorado support research to fill important gaps in public health knowledge and continue improving and standardizing data about marijuana use history and health effects in public health surveillance, medical care settings and research.

Collection and in-depth analysis of data regarding marijuana use should be continued using population-based surveys such as the Behavioral Risk Factors Surveillance System, the Healthy Kids Colorado Survey and Pregnancy Risk Assessment Monitoring System. Colorado also should continue to develop, improve and expand tools to monitor marijuana use patterns, such as CDPHE's Cannabis Users' Survey on Health.

CDPHE should continue using poison center and hospital data to monitor trends in potential marijuana health effects and assess the impact over time, especially among groups with higher rates of marijuana use. For the poison center, this includes implementing a surveillance protocol currently being developed and conducting more detailed data collection and analysis of unintentional marijuana exposures, especially in children under 9 years old. In order to better assess potential health impacts, data on hospitalizations and emergency department visits related to marijuana should be further explored. This includes continuing analysis of primary diagnoses in relation to marijuana-related billing codes and targeted projects like CDPHE's collaboration to evaluate ski-related injuries and marijuana.

In addition, improved testing methods and documentation are needed in relation to motor vehicle crashes and driving under the influence of drugs (DUID). Evaluation of death certificate and coroner's report data should continue, to determine how it can best be used in monitoring for potential marijuana-related deaths.

Public education on potential health effects of marijuana is important, particularly related to the effects of use during pregnancy, adolescent use, driving after using and unsafe storage around children. Dispensaries and industry should continue to partner with public health to disseminate education about these topics of highest concern. Education for health care providers on the known health effects of marijuana use may encourage more open dialogue between providers and patients.

Research gaps

Important research gaps related to the population-based health effects of marijuana use were identified during the literature and data review process. These research gaps were based on common limitations of existing research, exposures or outcomes not sufficiently studied, or issues important to public education or policymaking. These research gaps provide an important framework for continuing to prioritize research related to marijuana use and public health. The committee strongly recommends that Colorado support research to fill these important gaps in public health knowledge. While outside the scope of this committee's duties, the committee also recognizes that more research is needed on the potential therapeutic benefits of marijuana.

A common theme among the research gaps was the need for studies with better defined marijuana-use histories and practices. This should include frequency, amount, potency, and method of marijuana use, length of abstinence, and a standardized method for documenting cumulative lifetime marijuana exposure. A key need is to separately evaluate effects for less frequent users versus daily or near-daily users. Researchers should consider evaluating separately by age group, sex or other characteristics when the health effect being studied could differ among groups - for example, by age for cardiovascular effects or by sex for mental health effects.

Research gaps particularly important to public health and safety include: 1) Additional research using marijuana with THC levels consistent with currently available products; 2) Research on impairment in marijuana users who use more than weekly and may have developed tolerance; 3) Research to identify improved testing methods for impairment either through alternate biological testing methods or physical tests of impairment; and 4) Research to better characterize the pharmacokinetics/pharmacodynamics, potential drug interactions, health effects, and impairment related to newer methods of marijuana use such as edibles and vaporizing as well as other cannabinoids such as cannabidiol (CBD).

Marijuana and Public Safety in Colorado

JACK K. REED

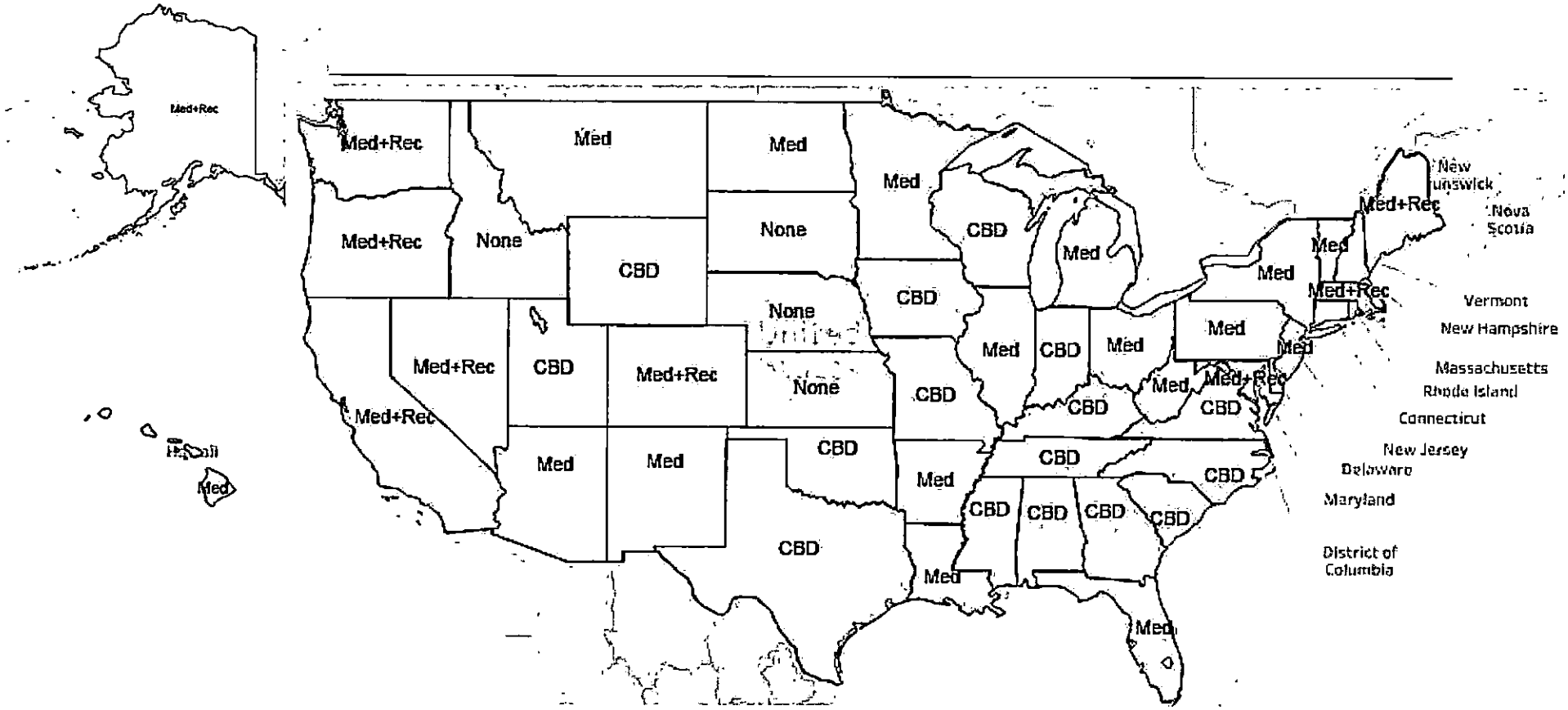
COLORADO DEPARTMENT OF PUBLIC SAFETY

DIVISION OF CRIMINAL JUSTICE

OFFICE OF RESEARCH & STATISTICS

NOVEMBER 2017

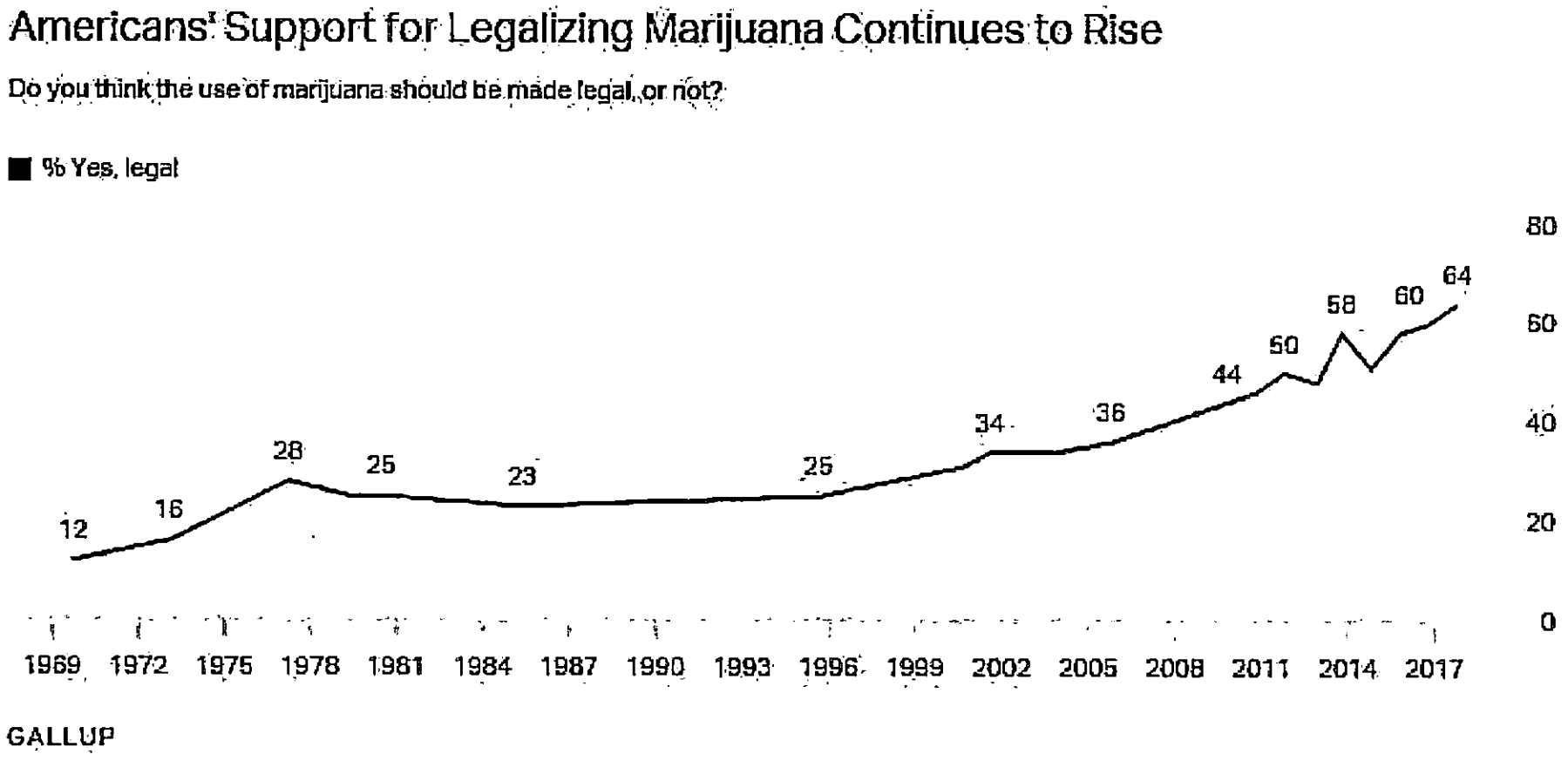
National Landscape of Marijuana Laws



Medical & Recreational: 8 States & DC --- Medical only: 22 States --- CBD only: 16 States --- None: 4 States

Source: National Conference of State Legislatures (2017), http://www.ncsl.org/research/health/state-medical-marijuana-laws.aspx
Note: Not all states' laws are currently in effect.

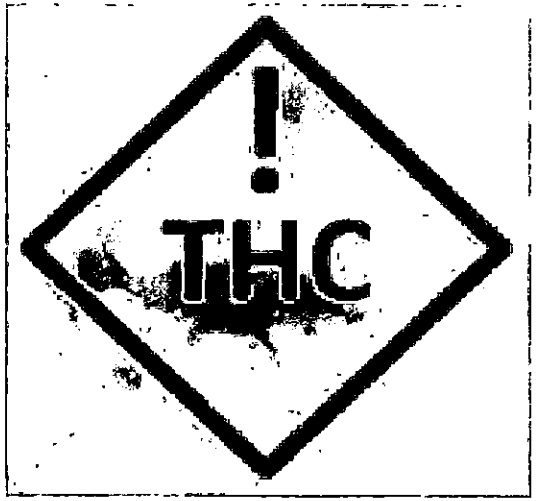
National Opinion on Legalizing Marijuana



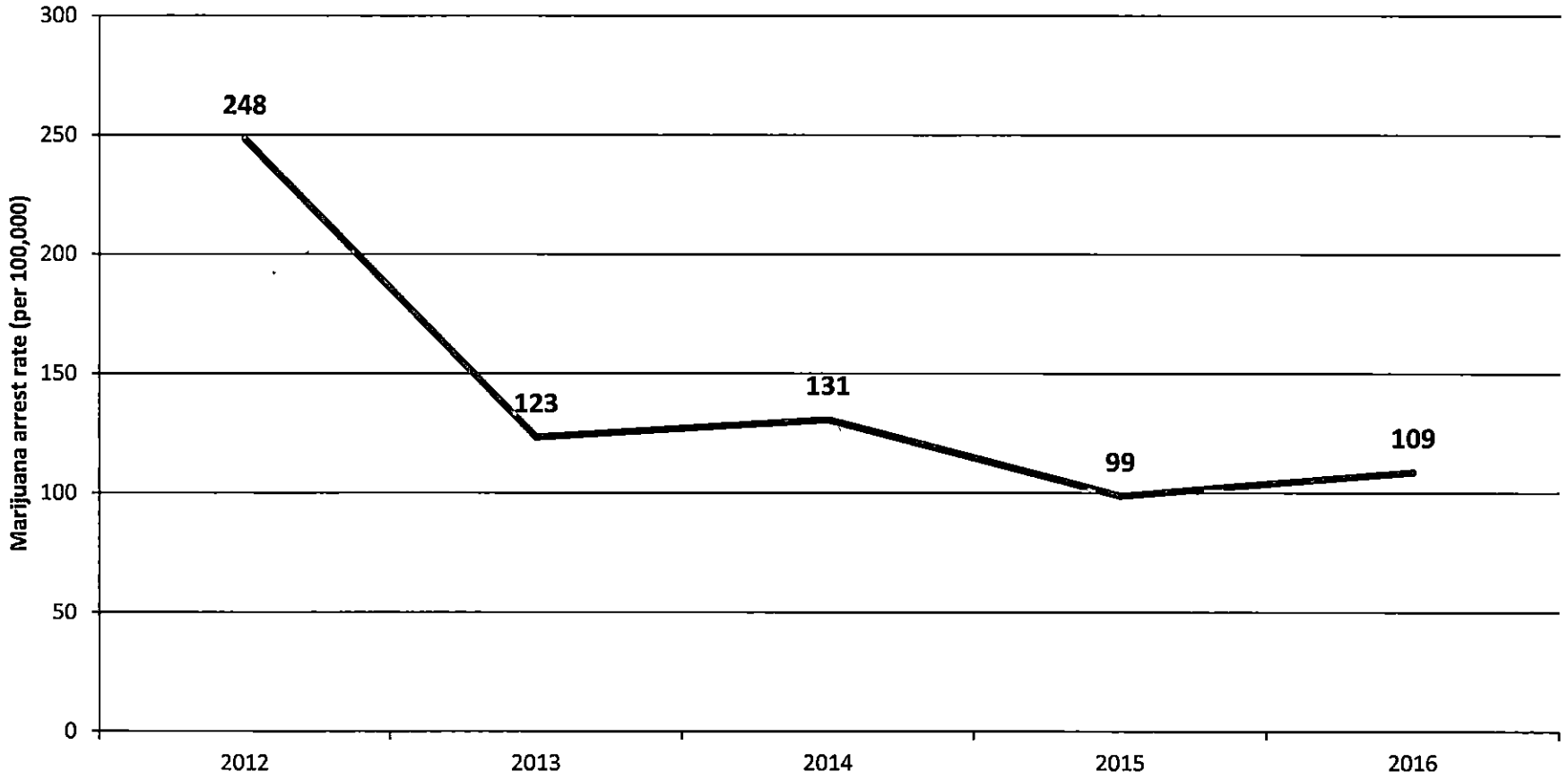
Source: Gallup Poll (2017), http://news.gallup.com/poll/221018/record-high-support-legalizing-marijuana.aspx

Changes to Colorado's Legal Landscape

- "Gray" and black market grows increasingly problematic
- Law limiting grows on residential property (HB 17-1220)
  - 12 plants per residential property
  - 24 plants for a caregiver
  - Penalties range from drug petty offense (1st offense & >12 plants) up to DF3 (2nd or subsequent offense with >24 plants)
- Established $6 million fund to reimburse law enforcement and district attorneys for enforcement of marijuana laws (HB 17-1221)
- New edible product rules
  - Required marking to indicate THC
  - None shaped like candy, fruit, people, animals

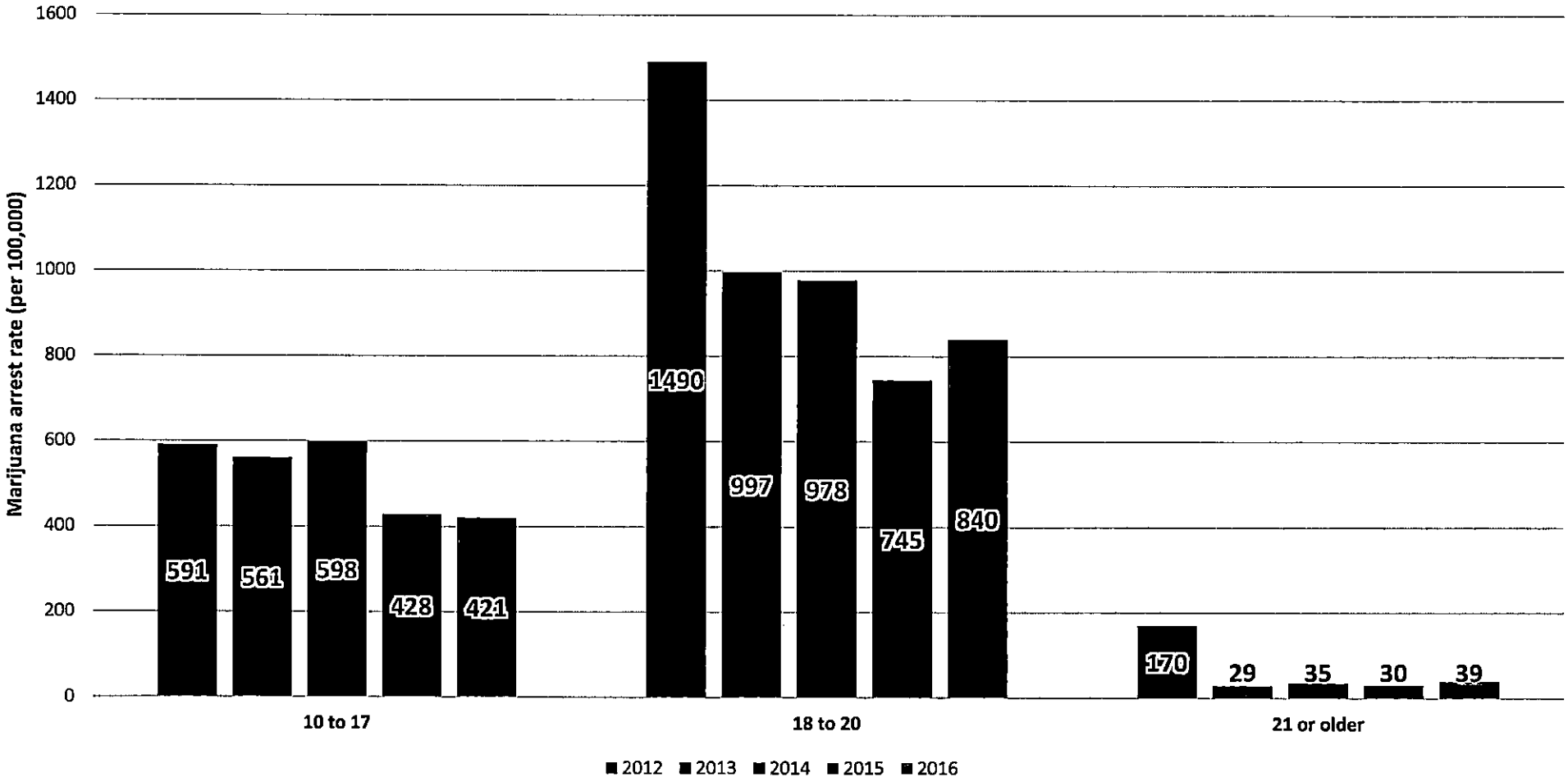


Marijuana Arrest Rates



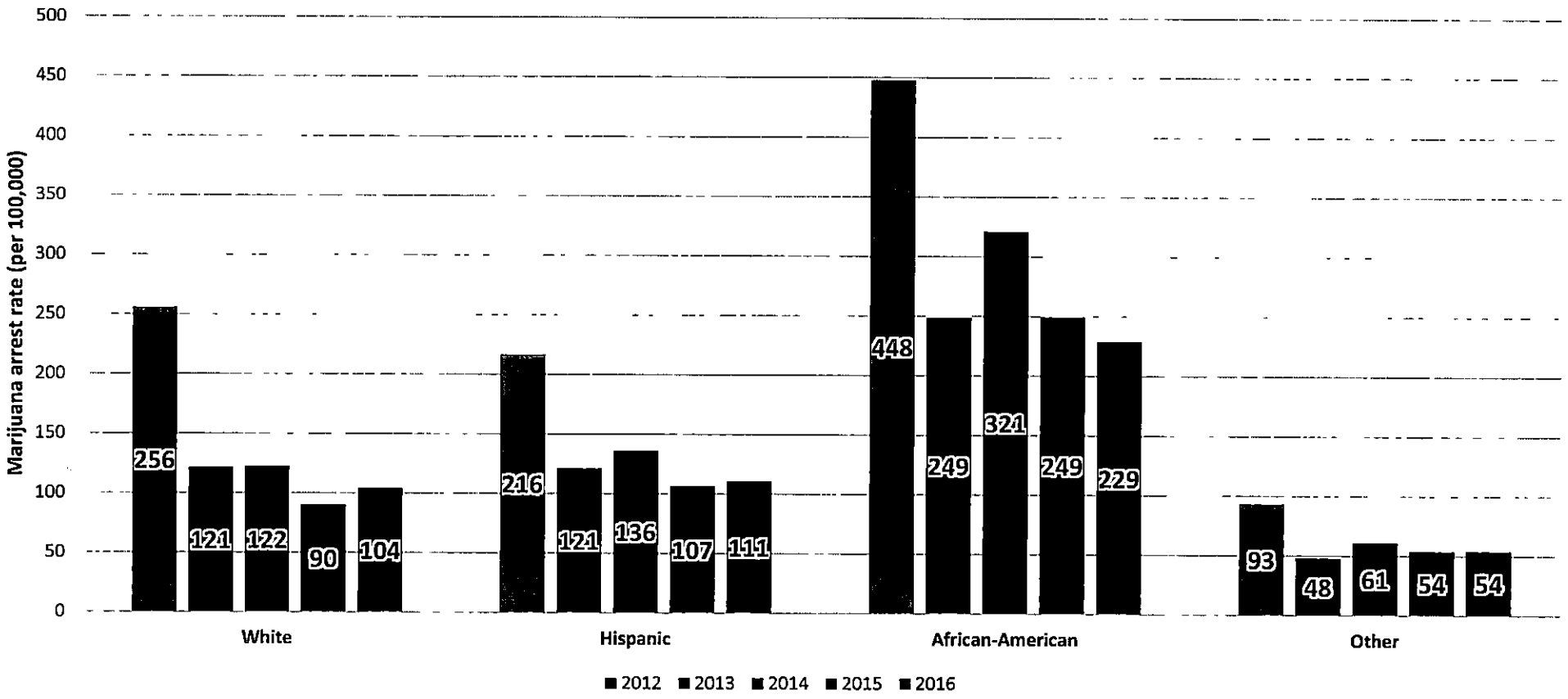
Source: Colorado Bureau of Investigation, National Incident-Based Crime Reporting System; Colorado Office of Demography.

Marijuana Arrest Rates, by age group



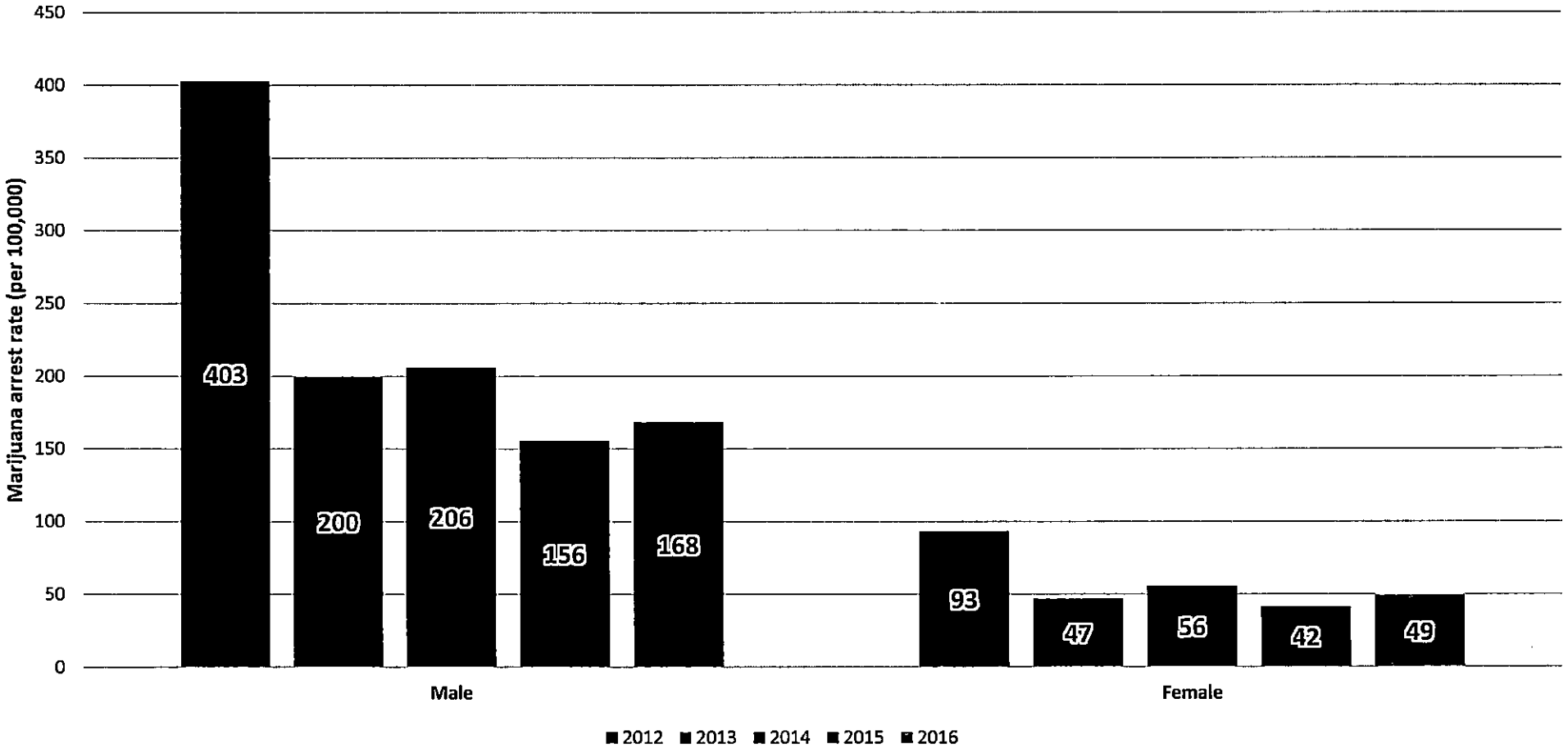
Source: Colorado Bureau of Investigation, National Incident-Based Crime Reporting System; Colorado Office of Demography.

Marijuana Arrest Rates, by race



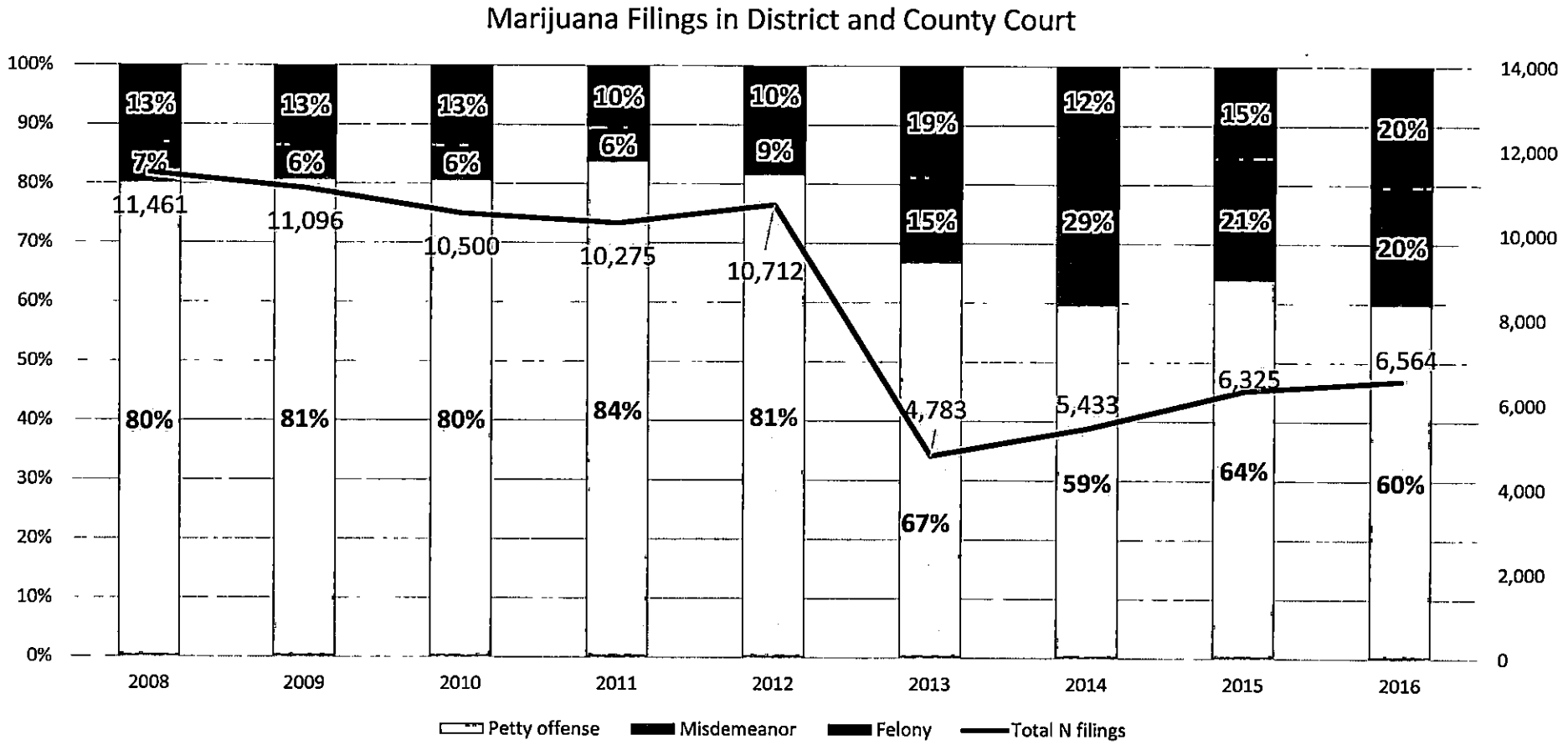
Source: Colorado Bureau of Investigation, National Incident-Based Crime Reporting System; Colorado Office of Demography.

Marijuana Arrest Rates, by gender



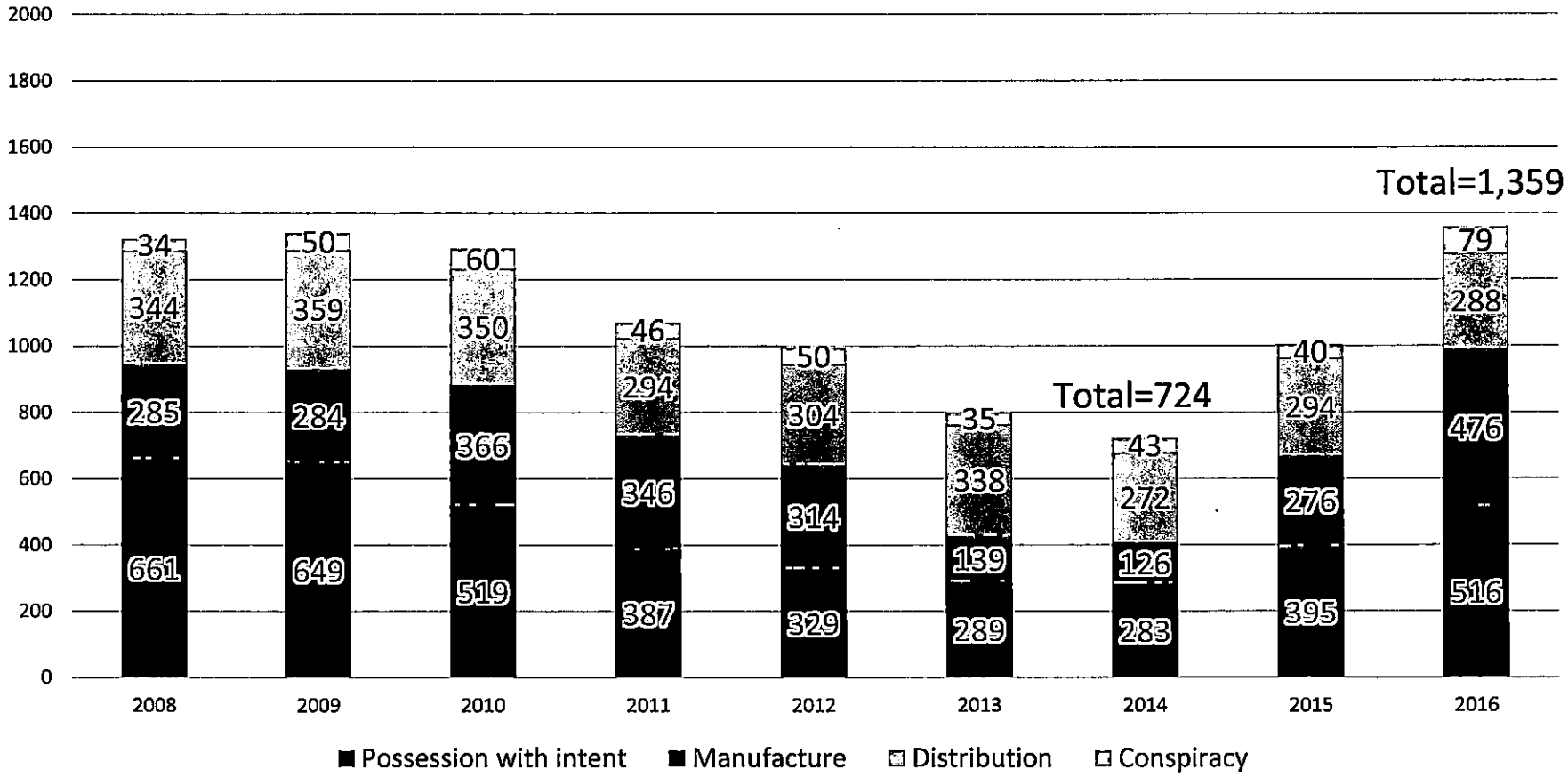
Source: Colorado Bureau of Investigation, National Incident-Based Crime Reporting System; Colorado Office of Demography.

Marijuana Filings



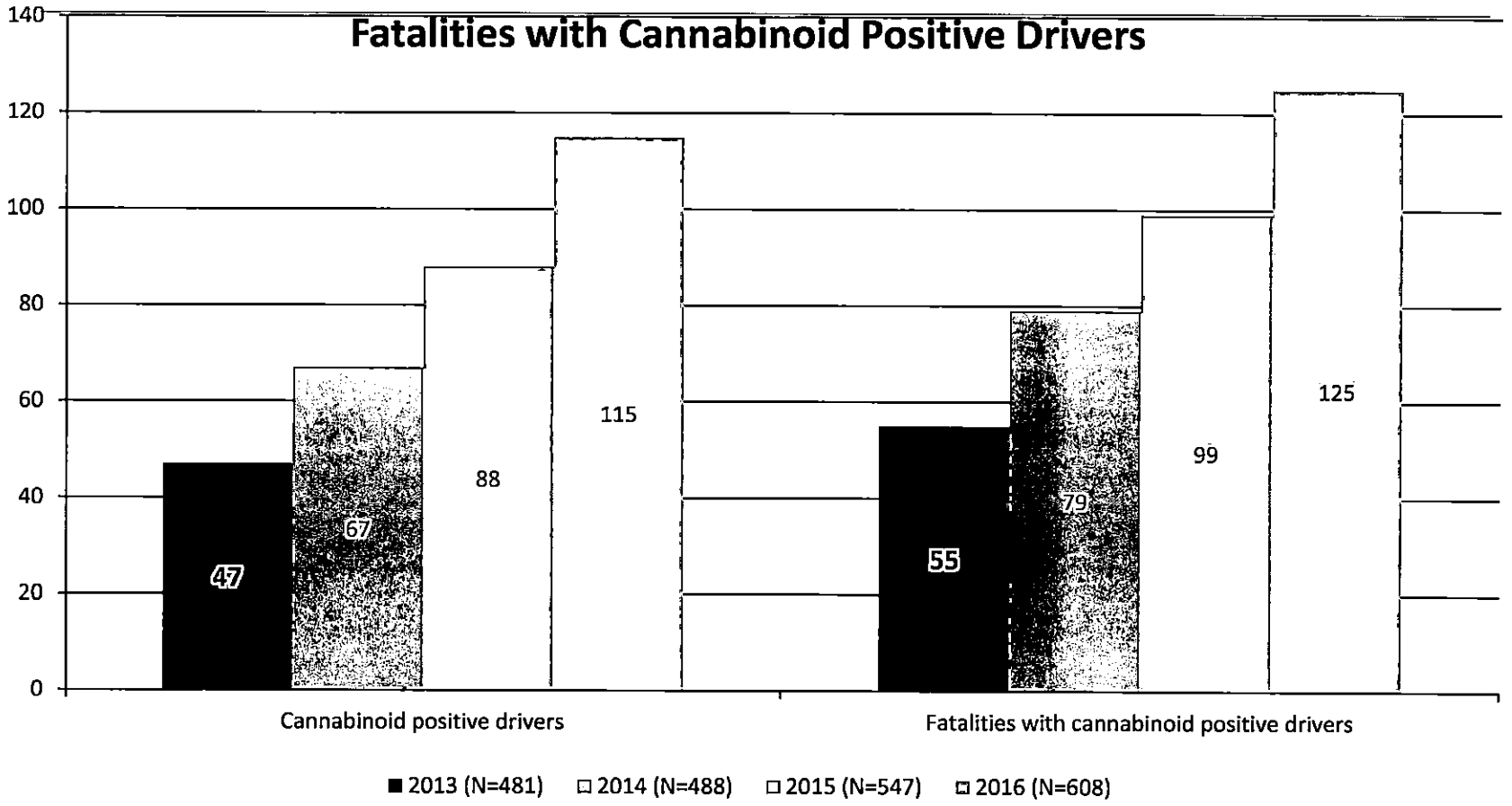
Source: Colorado State Judicial Branch.
Note: County court data does not include Denver County.

Marijuana Filings for Serious Drug Crime Types



Source: Colorado State Judicial Branch.
Note: County court data does not include Denver County.

Fatalities on Colorado Roadways

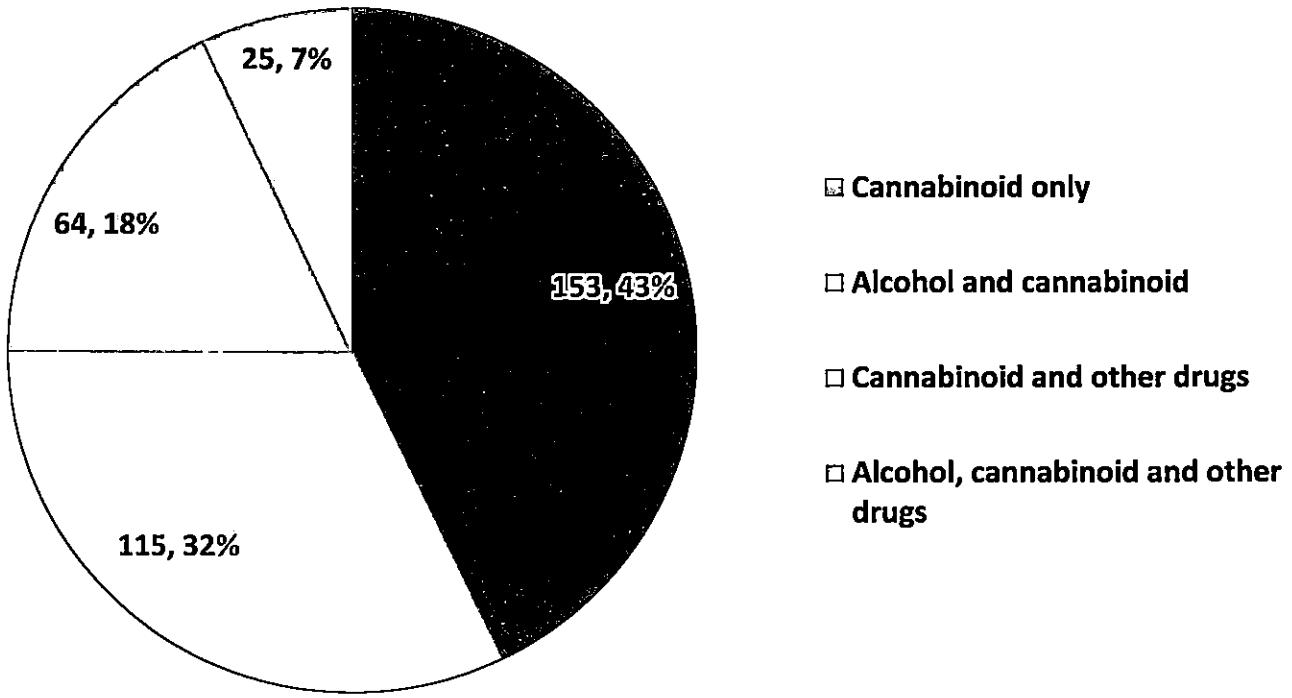


2016 DATA ARE PRELIMINARY AND SUBJECT TO CHANGE

Note: A positive test for cannabinoids may be the result of active THC or one of its inactive metabolites and does not necessarily indicate impairment.
Source: Data provided by Colorado Department of Transportation, 6/27/2017.

Fatalities on Colorado Roadways, 2013-16

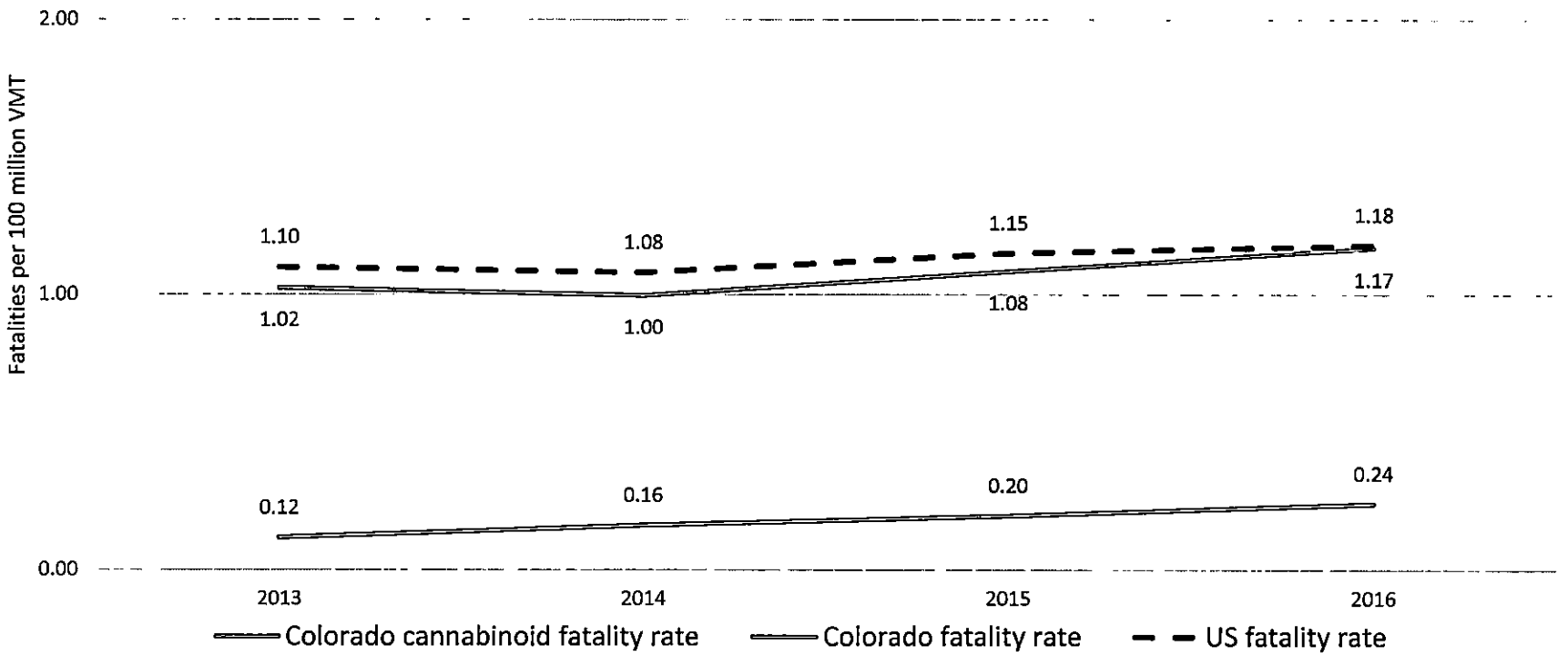
2013-16 Fatalities with Cannabinoid



2016 DATA ARE PRELIMINARY AND SUBJECT TO CHANGE

Note: In the period from 2013-2016 there were 357 fatalities where the driver tested positive for a cannabinoid and 2,123 fatalities overall. A positive test for cannabinoids may be the result of active THC or one of its inactive metabolites and does not necessarily indicate impairment.
Source: Data provided by Colorado Department of Transportation, 9/22/2017.

Fatality rates on Colorado & US Roadways, 2013-16



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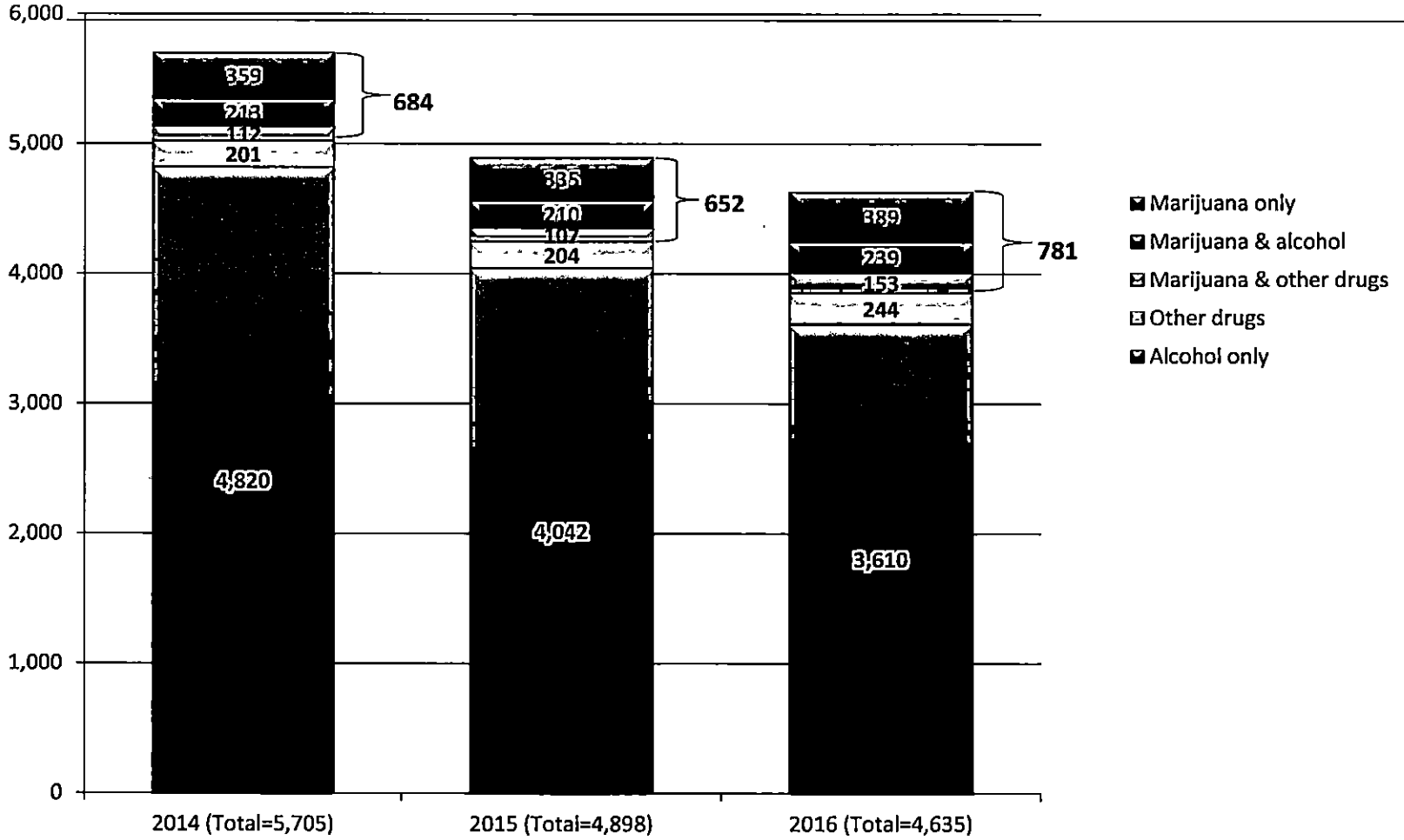
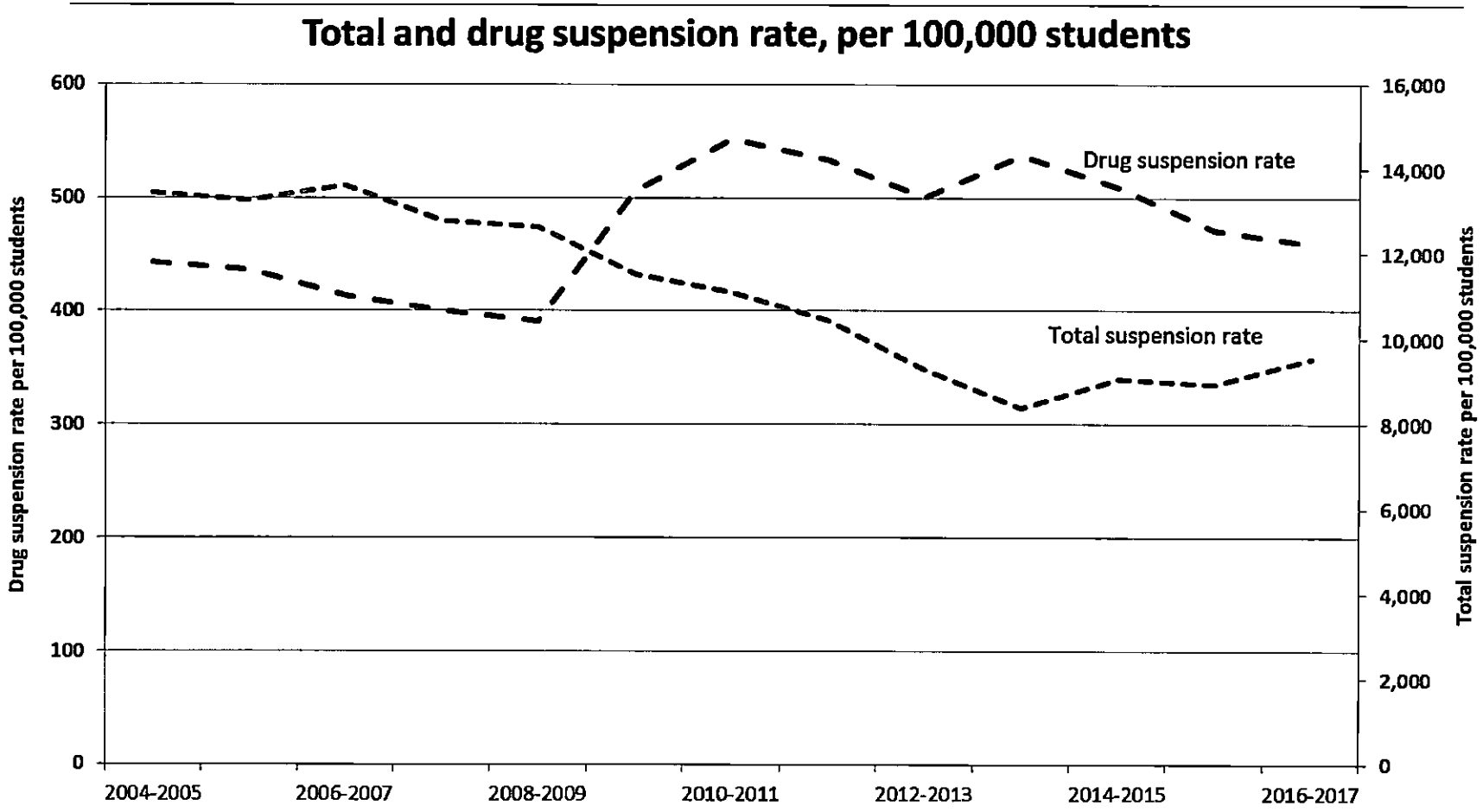
Source: Data provided by Colorado Department of Transportation, 9/22/2017; National Highway Transportation Safety Administration, *2016 Quick Facts; 2015 Quick Facts.*.

DUI Citations
Colorado State Patrol



Source: Colorado State Patrol.

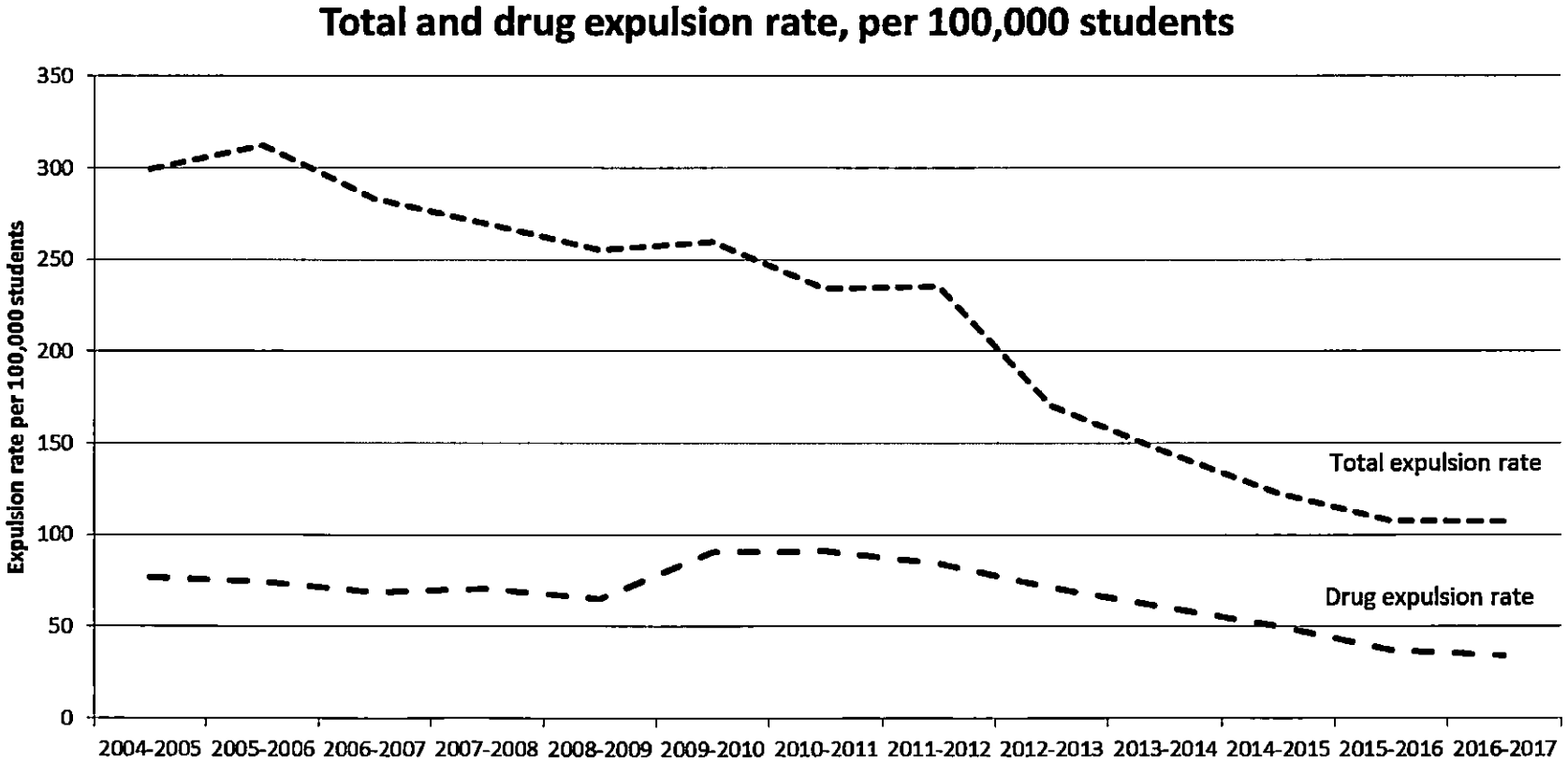
School Suspension Rate



Source: Colorado Department of Education (2017).

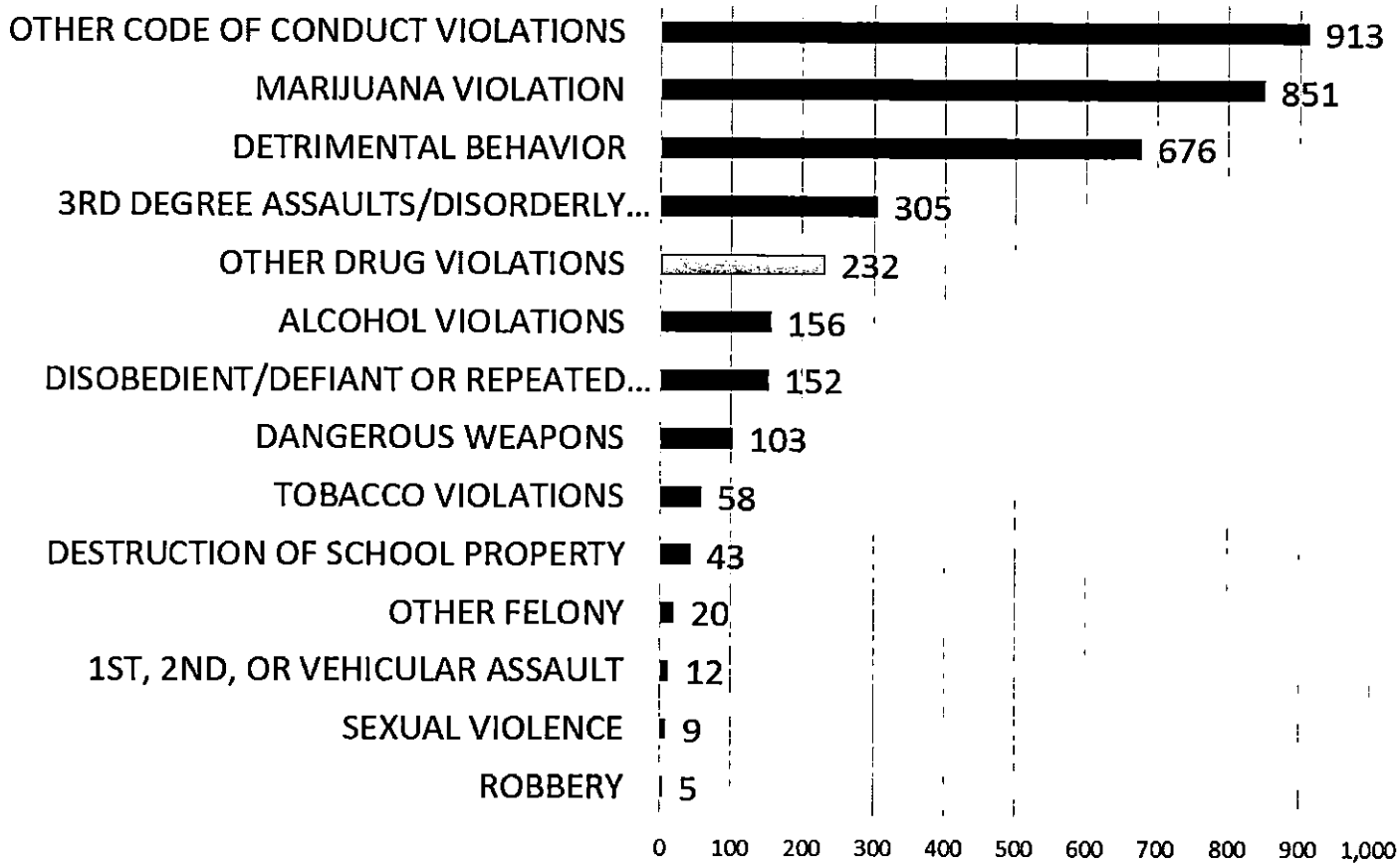
Note: The 2016-17 school year was the first complete year where marijuana was reported separately from other drugs.

School Expulsion Rate



Source: Colorado Department of Education (2017).
Note: The 2016-17 school year was the first complete year where marijuana was reported separately from other drugs.

Law Enforcement Referrals in Public Schools, 2016-17



Source: Colorado Department of Education (2017).
Note: The 2016-17 school year was the first complete year where marijuana was reported separately from other drugs.

School Discipline for Marijuana 2016-17

3,147 suspensions for marijuana

- 348 marijuana suspensions per 100,000 pupils
- 4% of total suspensions
- 76% of drug suspensions

211 expulsions for marijuana

- 23 marijuana expulsions per 100,000 pupils
- 22% of total expulsions
- 68% of drug expulsions

851 law enforcement (LE) referrals for marijuana

- 94 marijuana LE referrals per 100,000 pupils
- 24% of total LE referrals
- 79% of drug LE referrals

Note: The 2016-17 school year was the first with schools reporting marijuana separately from other drugs for the entire year.
Source: Colorado Department of Education

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