

# Trends in Marijuana Treatment Admissions, 2012-2016, Denver, Colorado

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## Introduction

With the legalization of medical marijuana in 2000, and opening of recreational marijuana shops in 2014, interest in understanding the health-related impacts of legalization and increased marijuana access is growing. This report examines drug and alcohol treatment data to take a closer look at potential changes in marijuana treatment admission patterns over time in the context of co-occurring trends in drug and alcohol treatment admissions. This report is divided into two sections: the first section focuses on all drug and alcohol treatments in Denver County (including marijuana) and the second section focuses on treatment admissions where marijuana was reported as the primary substance.

The objective of this report is to explore temporal trends, demographic patterns and substance use factors related to substance use disorder treatment admissions in Denver County between 2012 and 2016 and identify potential changes in substance treatment patterns in Denver, Colorado. Understanding the age, sex, and racial ethnic composition of treatment admissions and how they differ by substance provides insights into social changes and the potential implications related to marijuana legalization.

## Key Findings

- Most individuals admitted for treatment report substance use initiation before the age of 18 (56%). Among marijuana treatment admissions, over 80% reported initiating use of marijuana before the age of 18.
- There is evidence of increases in methamphetamine use within Denver County, with large increases in the percent of treatment admissions where methamphetamine was reported as a primary (3% in 2012 to 6% in 2016), secondary (3% in 2012 to 8% in 2016), or tertiary (4% in 2012 to 6% in 2016) substance.
- The count of treatment admissions where marijuana was reported as a primary, secondary, or tertiary substance remained relatively flat over time.
- Alcohol is the primary substance reported by a majority (70%) of treatment admissions. Among those admitted for treatment, only 7% report marijuana as their primary substance.

## Methods

This analysis used data from Colorado Drug/Alcohol Coordinated Data System (DACODS) and was restricted to clients living in Denver County who were admitted to treatment at a Colorado substance abuse treatment facility located between January 1, 2012 and December 31, 2016. DACODS is the primary client level data collection instrument used by the Colorado Office of Behavioral Health (OBH), a department of the Colorado Department of Human Services. The Office of Behavioral Health is responsible for licensing substance use disorder programs that receive public funding. The substance use treatment license identifies the level of services provided at the facility. Available services include: residential, outpatient or withdrawal management (detox), and any specialized services. Specialized services include: individuals referred to treatment following a driving under the influence (DUI) conviction, individuals required through their involvement in the criminal justice system to complete treatment as part of a court sentence, or mothers receiving tailored treatment to meet their needs<sup>1</sup>.

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<sup>1</sup> Colorado Department of Human Services. (2018). *Behavioral Health Designation and Licensing*. Retrieved from <https://www.colorado.gov/pacific/cdhs/behavioral-health-designation-and-licensing>

All publicly funded substance abuse treatment facilities in Colorado licensed by OBH are required to enter data on every treatment admission into the DACODS system. DACODS collects and stores data on client demographics, self-reported drug use history, and specific mental and chronic health conditions. Clients must report a primary substance contributing to the treatment admission and may report a secondary and tertiary substance including detailed information about the frequency, duration, and history of use for each substance. Substances include: alcohol, anabolic steroids, barbiturates, benzodiazepines, buprenorphine, clonazepam, crack cocaine, GHB, heroin, inhalants, ketamine, LSD, PCP, ecstasy, marijuana, methamphetamine, nicotine, non Rx methadone, and synthetic opioids as well as other amphetamines, hallucinogens, sedatives, stimulants, tranquilizers, and over the counter drugs.

DACODS data is treatment episode-based meaning the sample size (n) is a reflection of unique treatment admissions and not the number of unique patients. DACODS data is collected at admission and the client has the option to decline answers to any questions, which limits the completeness of some variables.

This report focused on the distribution of treatment episodes by primary, secondary, and tertiary substances including the demographic profile of those admitted for treatment. Treatment referral type, clinical impression at admission, and age of first substance use were compared by substance and over time.

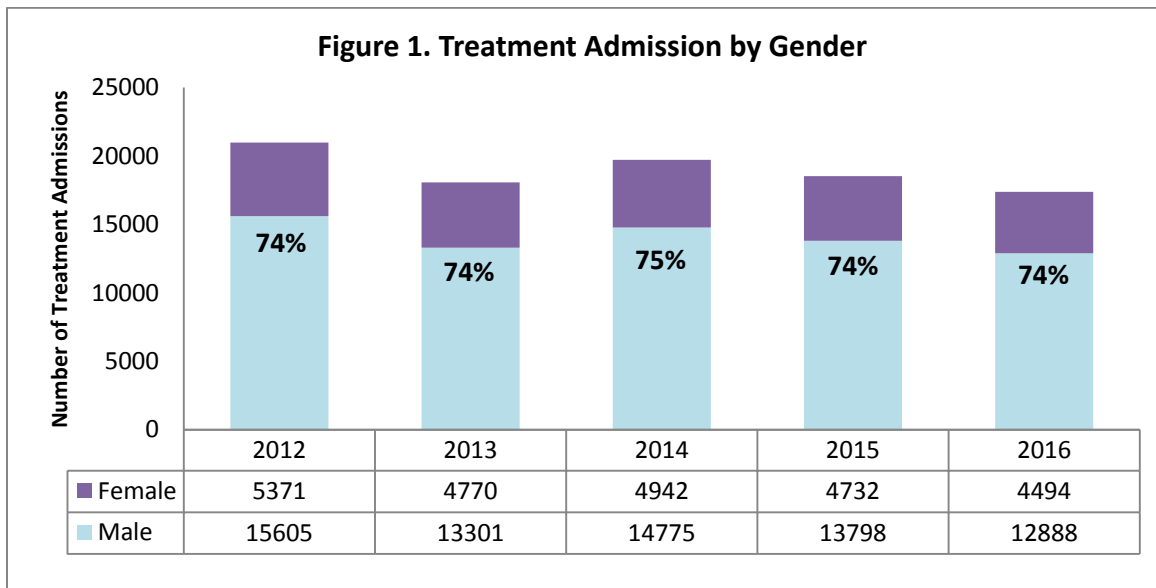
The first report section includes treatment admissions for all substances including alcohol. The second report section focuses exclusively on treatment admissions where marijuana was noted as the primary substance.

## **Section 1: Trends in Drug and Alcohol Treatment**

Section 1 examines the demographic composition of treatment admissions over time and potential changes in substance use based on all treatment admissions. Overall, the demographic characteristics of treatment admissions have changed minimally over the past five years.

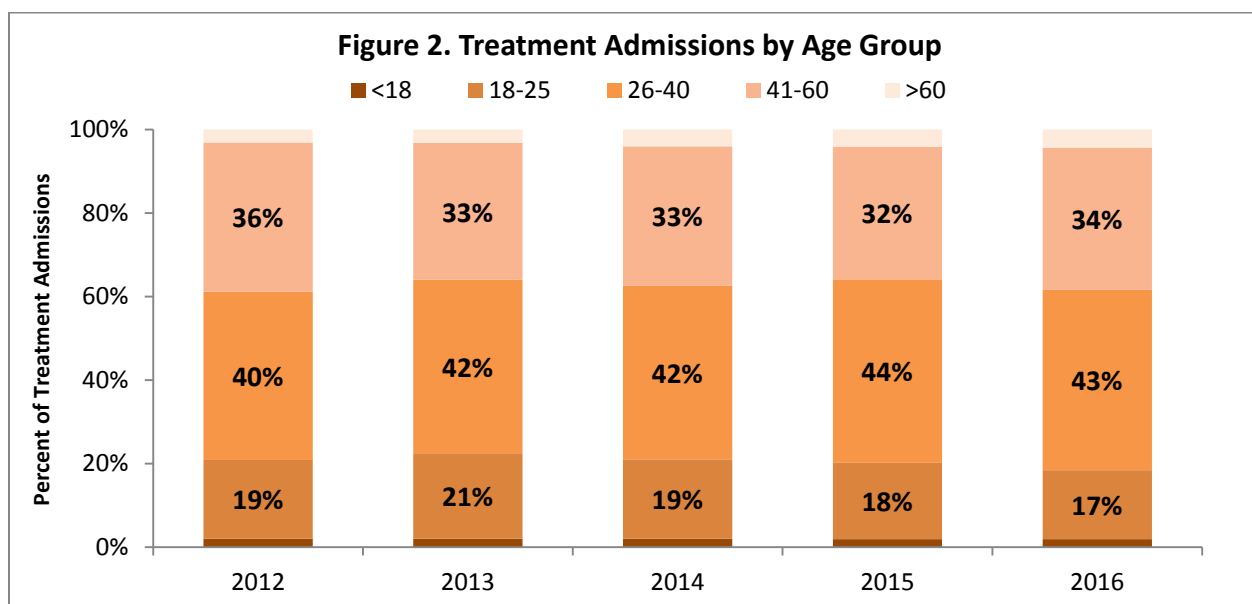
### **Gender Trends in Treatment Admission**

Figure 1 presents the count and percent of males and females receiving treatment by year and helps to visualize treatment admission volume over time. The purpose of Figure 1 is to show the composition of treatment admissions by gender and illuminate any changes in composition over time, as well as give a general idea of how many treatment admissions occur each year. The number of treatment admissions has decreased over time (20,976 in 2012 to 17,382 in 2016). Roughly 3 out of 4 treatment admissions are male with no significant change between 2012 and 2016.



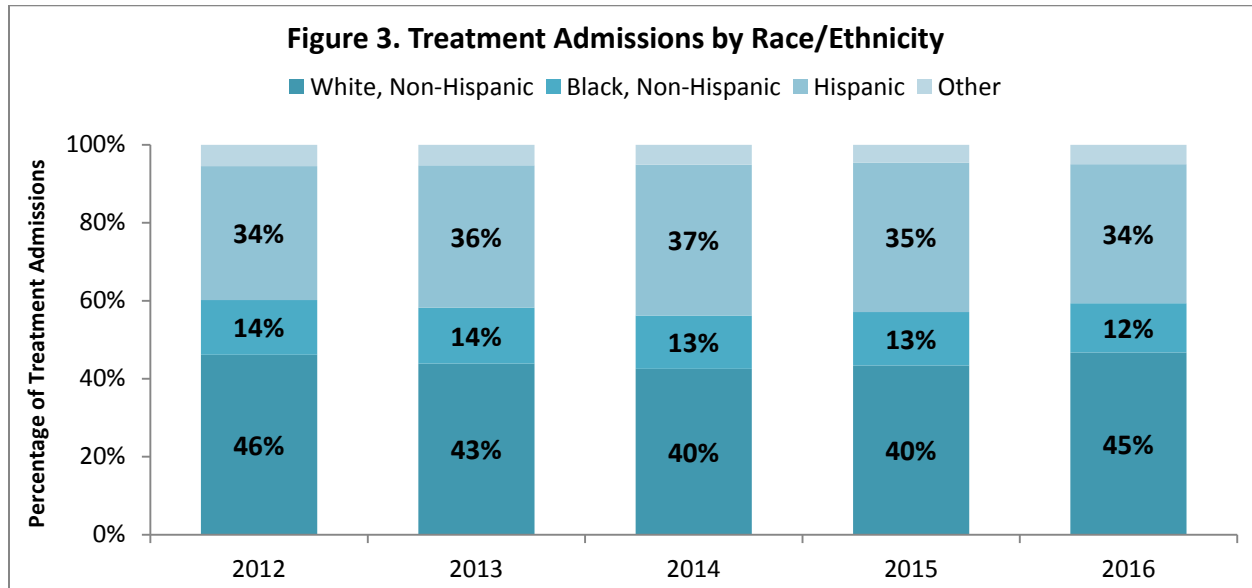
### Age Group Trends in Treatment Admission

Figure 2 shows the percent of treatment admission by age group by year. The goal of Figure 2 is to understand what age groups make up the majority of Denver treatment admissions and examine any changes in the age composition over time. Most treatment admissions were clients between 26-40 years of age with a modest increase from 40% of admissions in 2012 to 43% of admissions in 2016. The percent of younger treatment admissions, 18-25 years of age, decreased slightly from 19% in 2012 to 17% in 2016 and the percent of older treatment admissions, 41-60 years of age, decreased slightly from 36% in 2012 to 34% in 2016. Treatment admissions where clients are under 18 or over 60 years make up the smallest proportion of admissions.



## Race and Ethnicity Trends in Treatment Admission

Figure 3 represents the percent of treatment admissions each year by race and ethnicity. The purpose of Figure 3 is to determine if the racial ethnic composition of treatment admissions is representative of Denver County and observe changes over time. The majority of treatment admissions are among individuals who identify as White, non-Hispanic (43%) or Hispanic (35%) which aligns with the composition of Denver County<sup>2</sup>. The percentage of other race/ethnicities (Asian, Native American/ Alaskan Native, Native Hawaiian/Pacific Islander) admitted to treatment has declined by 11%. The percentage of Black, non-Hispanics admitted to treatment has declined by 12%.

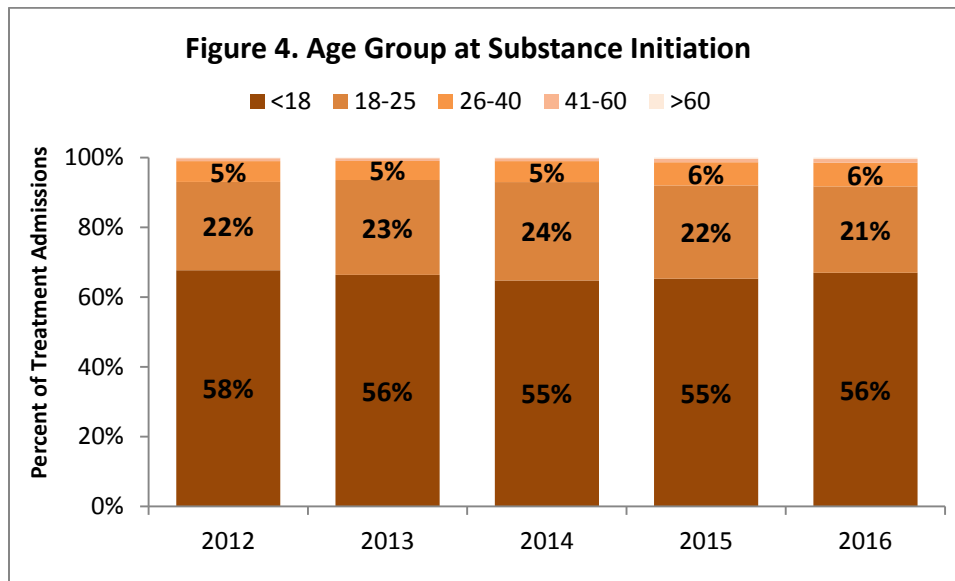


Note: From 2014-2016 about 3% of treatment admissions decline recording information about Race/Ethnicity.

## Age at Initiation Trends in Treatment Admission

Figure 4 shows the percent of treatment admissions' age of initiation of their primary substance by year. The purpose of Figure 4 is to understand what age groups are at greatest risk for substance use initiation leading to treatment. Most treatment admissions (56% in 2016) reported initiating use of their primary substance before the age of 18 and the distribution of age of initiation shows only minor changes between 2012 and 2016.

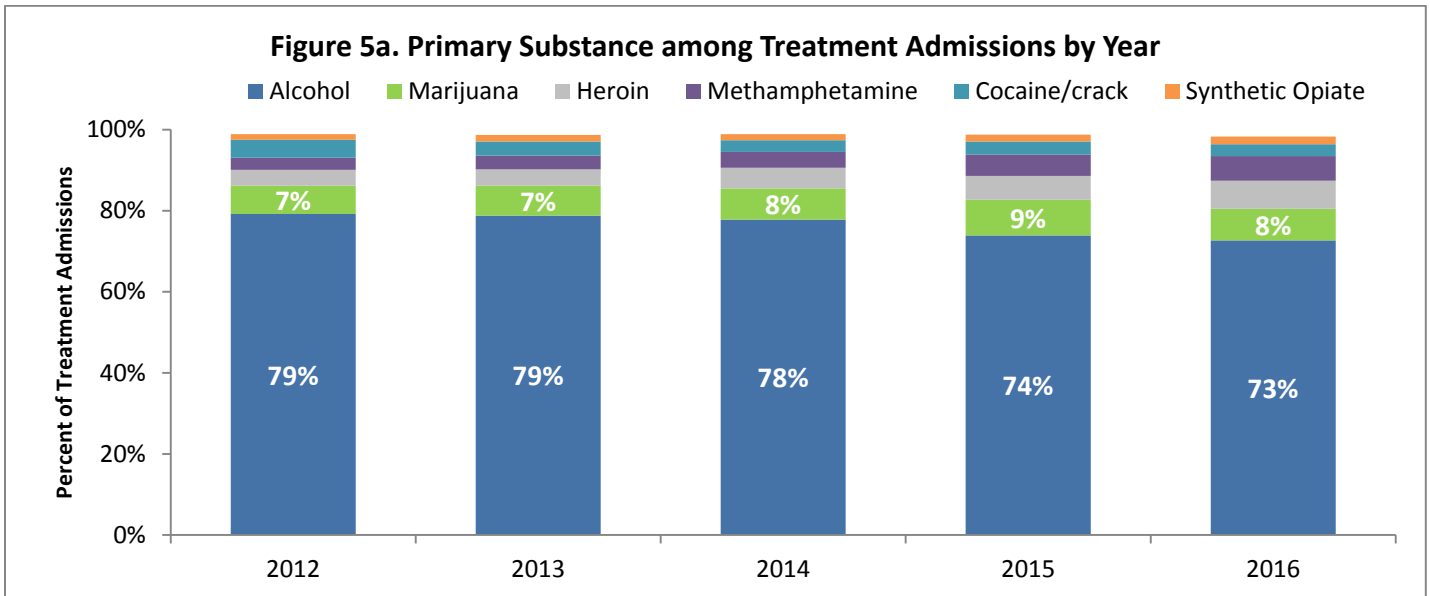
<sup>2</sup> U.S. Census Bureau (2016). *American Community Survey 1-year estimates*. Retrieved from *Census Reporter Profile page for Denver County, CO* <<https://censusreporter.org/profiles/05000US08031-denver-county-co/>>



Note: From 2012-2016 about 16% of treatment admissions declined recording information about age at primary substance initiation.

### Primary Substance and Polysubstance Use Trends in Treatment Admission

Up to three substances of use are recorded at treatment admission. Figures 5a and 5b show the top five substances reported as a primary substance by clients at treatment admission. The goal of Figures 5a and 5b are to understand what substances are driving treatment admissions and how distribution has changed over time. Figure 5a shows the distribution of substances including alcohol and 5b shows the distribution excluding alcohol using a modified scale to better visualize changes in the substances that compose a smaller proportion of the whole. The top five substances treatment admissions report as their primary substance include alcohol (77%), marijuana (8%), heroin (5%), methamphetamine (4%), and crack cocaine (3%). Alcohol is the primary substance listed for a large majority of treatment admissions across all years, but the percentage of clients reporting alcohol as their primary substance has decreased from 79% in 2012 to 73% in 2016.



Note. Figure 5 only includes the top five reported substances and does not include about 1% of treatment admissions where a less common substance was reported as the primary substance.

The percent of treatment admissions for methamphetamines has doubled from 3% in 2012 to 6% in 2016 and substantially increased for heroin from 4% in 2012 to 7% in 2016. There have also been small increases in the percentage of clients reporting marijuana 7% in 2012 to 8% in 2016 as their primary substance.

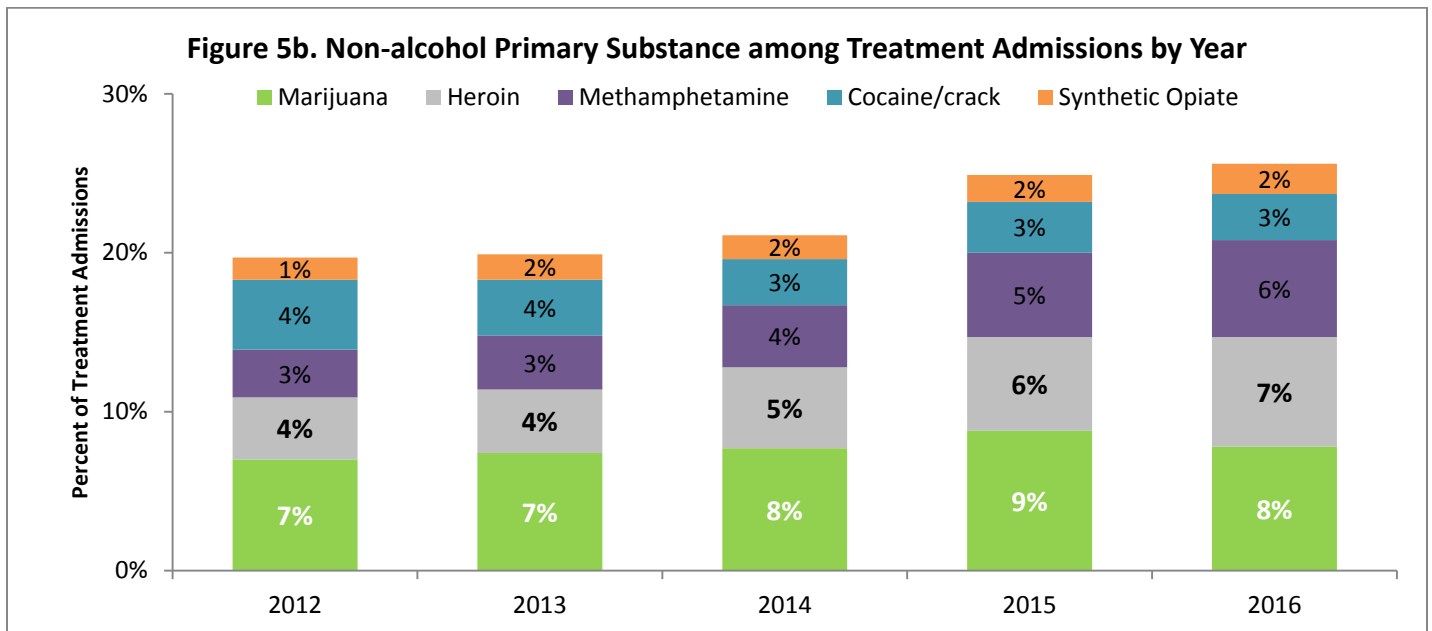
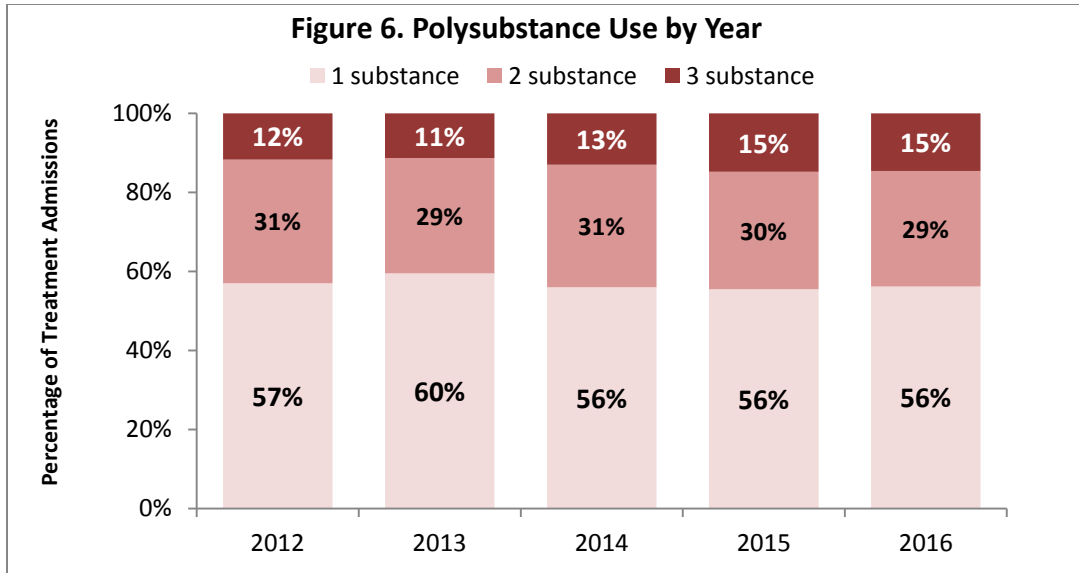


Figure 6 shows the percentage of treatment admissions reporting polysubstance use or more than one substance by year. The goal of Figure 6 is to understand how common polysubstance use is among treatment admissions and how it

has changed over time. Over half (57%) of treatment admissions reported only a primary substance of abuse. Of treatment admissions where more than one substance was captured (polysubstance use), a majority of admissions reported two substances.



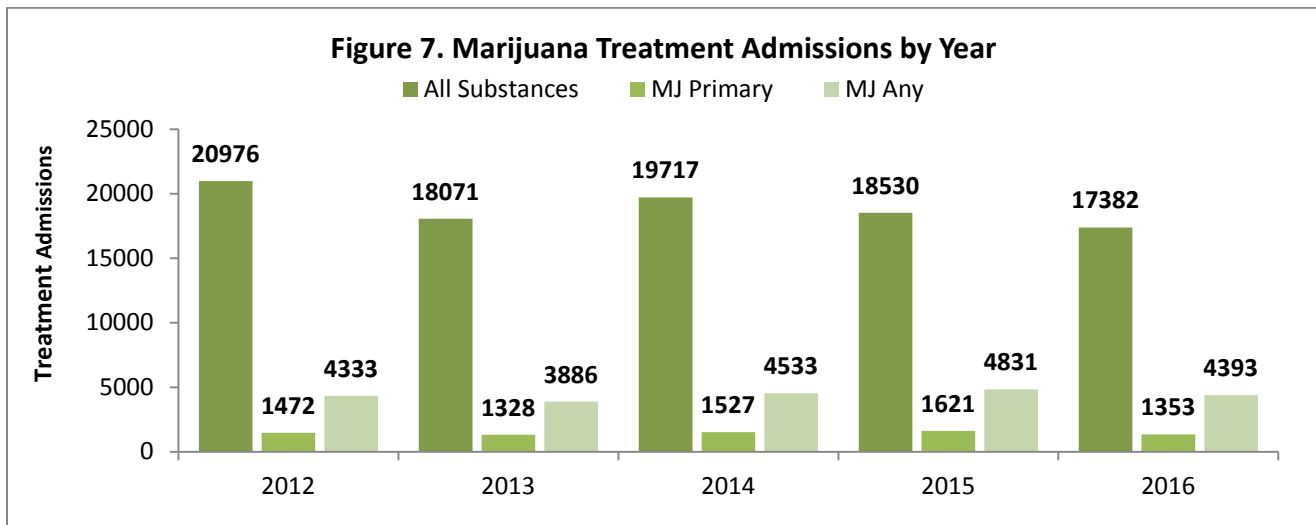
Among treatment admissions who reported polysubstance use, the top five secondary substances included: nicotine (39%), marijuana (28%), alcohol (13%), crack cocaine (9%), and methamphetamine (5%). From 2012 to 2016, the percentage of treatment admissions reporting nicotine as their second substance decreased from 44% in 2012 to 31% in 2016. The percentage of treatment admissions reporting marijuana as their second substance has increased from 25% in 2012 to 31% in 2016. The percentage of treatment admissions reporting methamphetamine as their second substance has increased from 3% in 2012 to 8% in 2016. Among the 13% of treatment admissions who reported a third substance the top five substances included: nicotine (31%), marijuana (27%), crack cocaine (15%), alcohol (12%), and methamphetamine (5%).

## Section 2: Trends in Marijuana Treatment

Section 2 of this report focuses on treatment admissions where marijuana was reported as the primary substance, referred to as marijuana treatment admissions. The purpose of this section is to better understand how many marijuana treatment admissions occur, the demographic composition of marijuana treatment admissions, referral sources for marijuana treatment admissions, age at initiation of marijuana use, and polysubstance use among marijuana treatment admissions.

Figure 7 presents counts of all treatment admissions, marijuana treatment admissions, and treatment admissions where marijuana was recorded as the primary, secondary, or tertiary substance. The goal of Figure 7 is to show how many marijuana treatment admissions there are in relation to the total number of all treatment admissions.

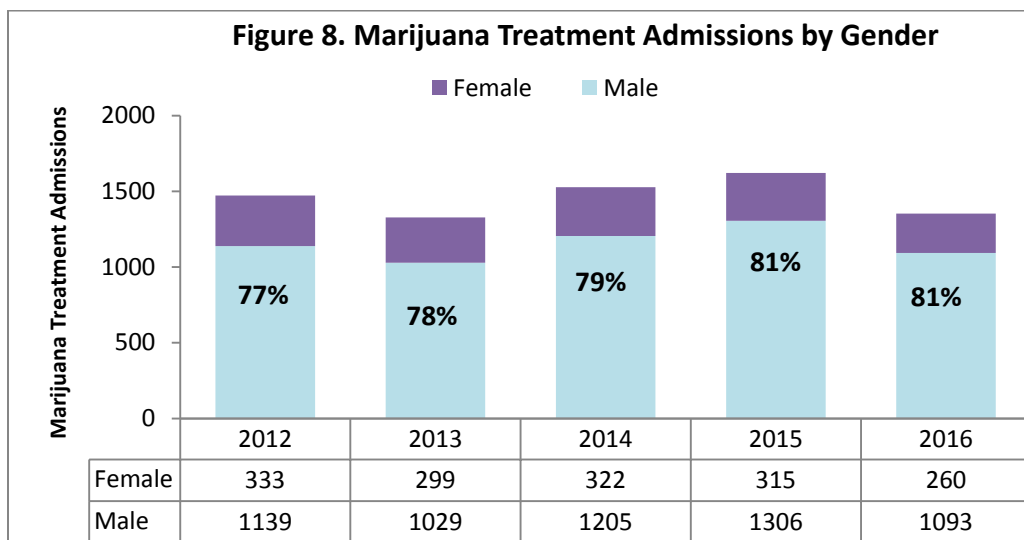




Between 7% and 9% of treatment admissions report marijuana as the primary substance, referred to as a marijuana treatment admission. The volume of marijuana treatment admission has not increased or decreased significantly following marijuana legalization. When considering marijuana-related treatment admissions, where an admission had a non-marijuana primary substance but marijuana use was reported, over 20% of treatment admissions reported marijuana use between 2012 and 2016. While marijuana treatment admissions are rare, marijuana use among those receiving treatment is more common. The remainder of Section 2 will focus on marijuana treatment admissions.

### Gender Trends in Marijuana Treatment

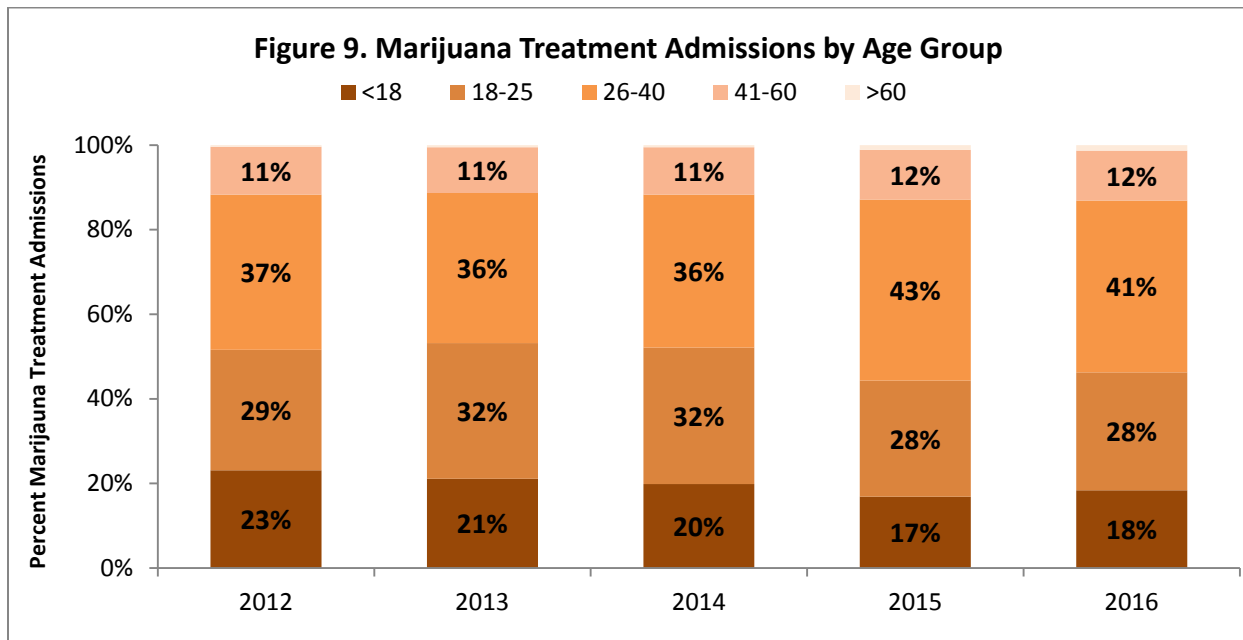
Figure 8 shows the count and percent of marijuana treatment admissions broken down by gender. The goal of Figure 8 is to understand how many males and females have a treatment admission for marijuana each year and how it has changed over time.



A majority of marijuana treatment admissions are among males and has increased from 77% in 2012 to 81% in 2016. The proportion of marijuana treatment admissions that are male is higher compared to the proportion of all treatment admissions that are male.

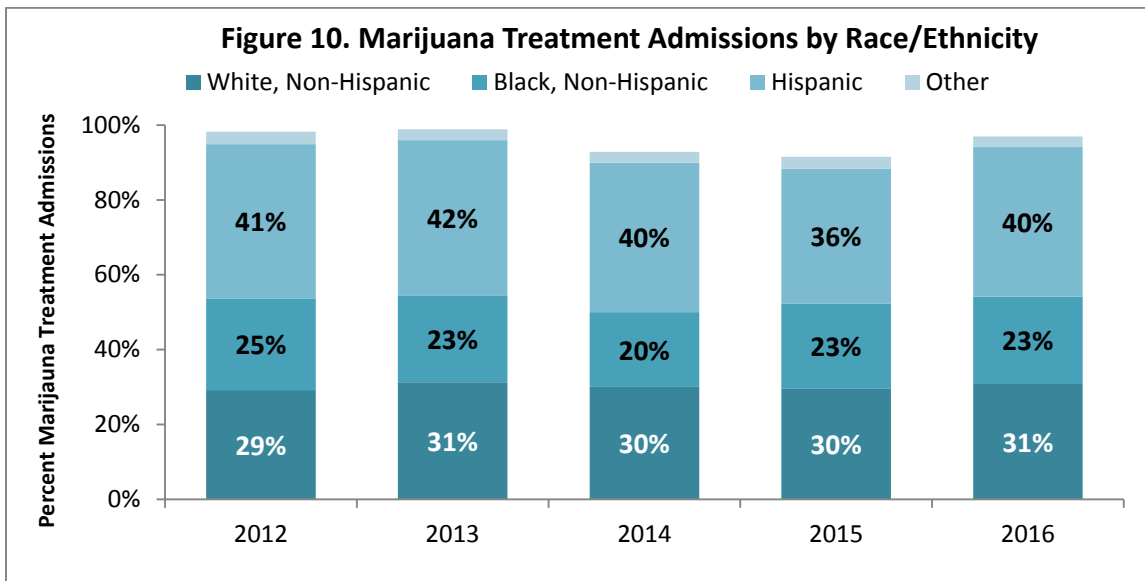
### Age Trends in Marijuana Treatment

Figure 9 illustrates the age group composition for marijuana treatment admissions. Figure 9 highlights which age groups were most likely to be in treatment for marijuana and observe how this demographic was different from other substances of abuse. Over the past five years, the majority of marijuana treatment admission fell within two age groups: 18-25 years of age (30%) and 26-40 years of age (39%). The percentage of marijuana treatment admission for individuals 26-40 years of age has increased from 37% in 2012 to 41% in 2016. The percentage of marijuana treatment admissions for individuals <18 years of age has decreased from 23% in 2012 to 18% in 2016.



### Race and Ethnicity Trends in Marijuana Treatment

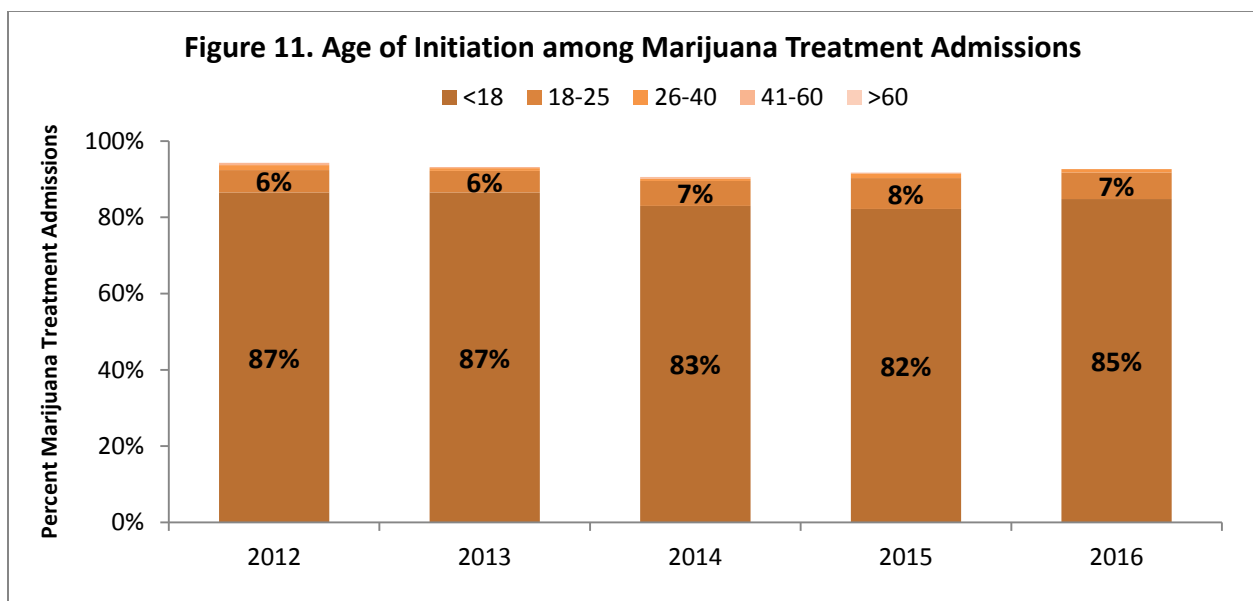
Figure 10 represents the percent of marijuana treatment admissions each year by race and ethnicity. The purpose of Figure 10 is to show the racial ethnic composition of marijuana treatment admissions to identify changes over time. White, non-Hispanics (30%) and Hispanics (40%) compose a majority of marijuana treatment admissions. There have been few changes in the racial ethnic demographics of individuals reporting marijuana as the primary substance.



Note: From 2014-2016 about 3% of treatment admissions declined recording information about Race/Ethnicity.

### Age at Initiation Trends in Marijuana Treatment

Figure 11 shows the age of primary substance (marijuana) initiation among marijuana treatment admissions. The purpose of Figure 11 is to determine at what age the majority of marijuana treatment admissions initiated use of marijuana. More than 4 out of 5 marijuana treatment admissions reported initiating use of marijuana before the age of 18. The percentage of clients reporting age of initiation before the age of 18 has decreased from 87% in 2012 to 85% in 2016.



Note: Each year about 7% of marijuana treatment admissions declined recording information about age of initiation.

## Referral Source Trends in Marijuana Treatment

Not all marijuana treatment episodes are initiated by the individual receiving treatment; many marijuana treatment episodes in the DACODS system are the result of a referral from an outside entity or organization. The goal of Figure 12a and Figure 12b is to examine what referral sources result in marijuana treatment admissions and how referral trends have changed since legalization.

Figure 12a displays the percent of marijuana treatment admission resulting from a variety of referral sources. Possible referral sources include: non DUI criminal justice, drug abuse care providers, driving under the influence or DUI criminal justice, drug court, individual, other community referral, other health care provider (e.g., medical, mental), and human service organizations. For the purpose of this analysis, only the top nine treatment admission referrals were included.

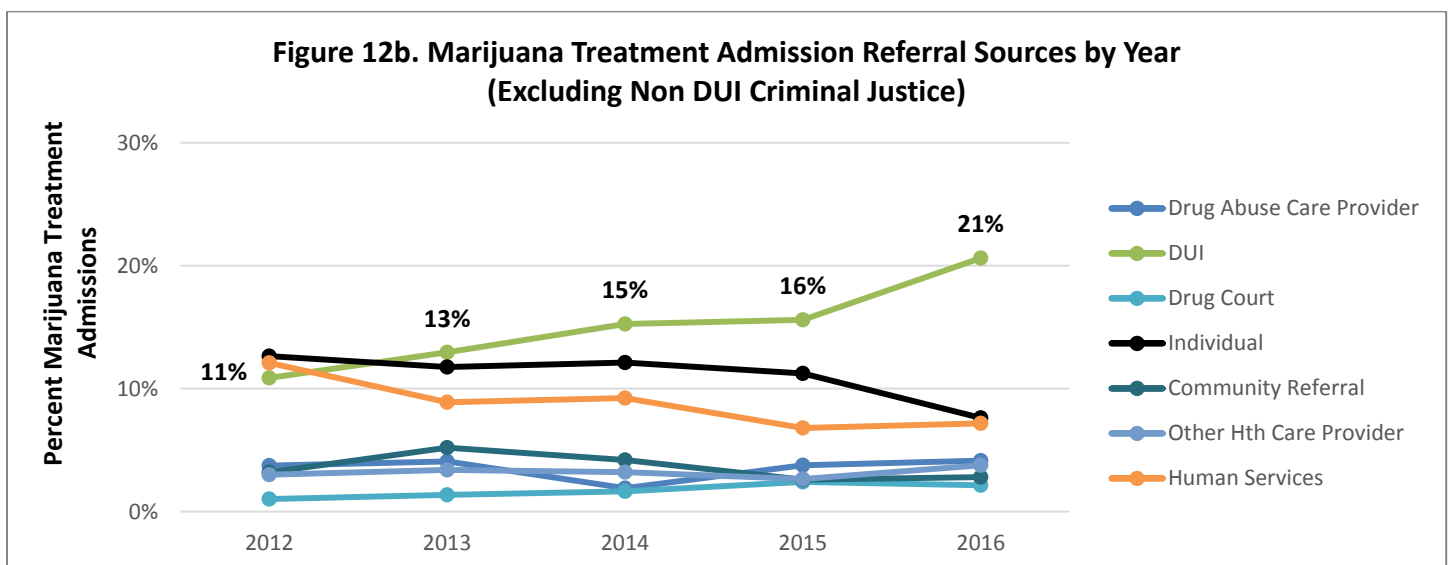
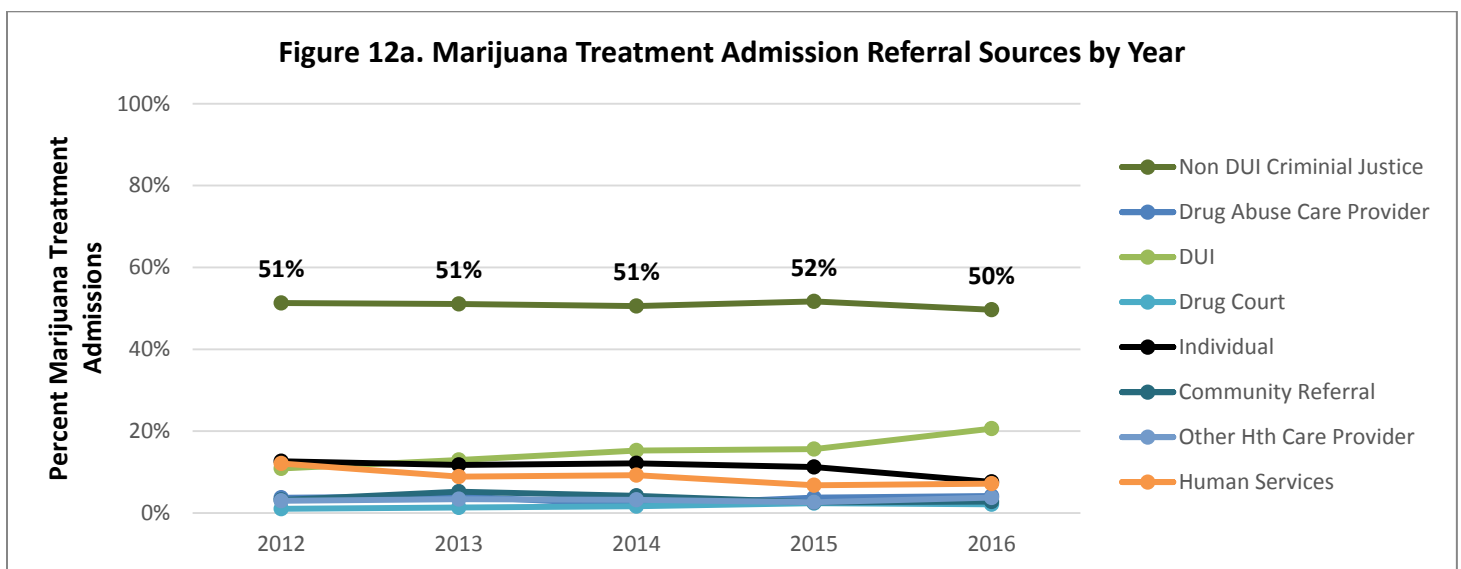
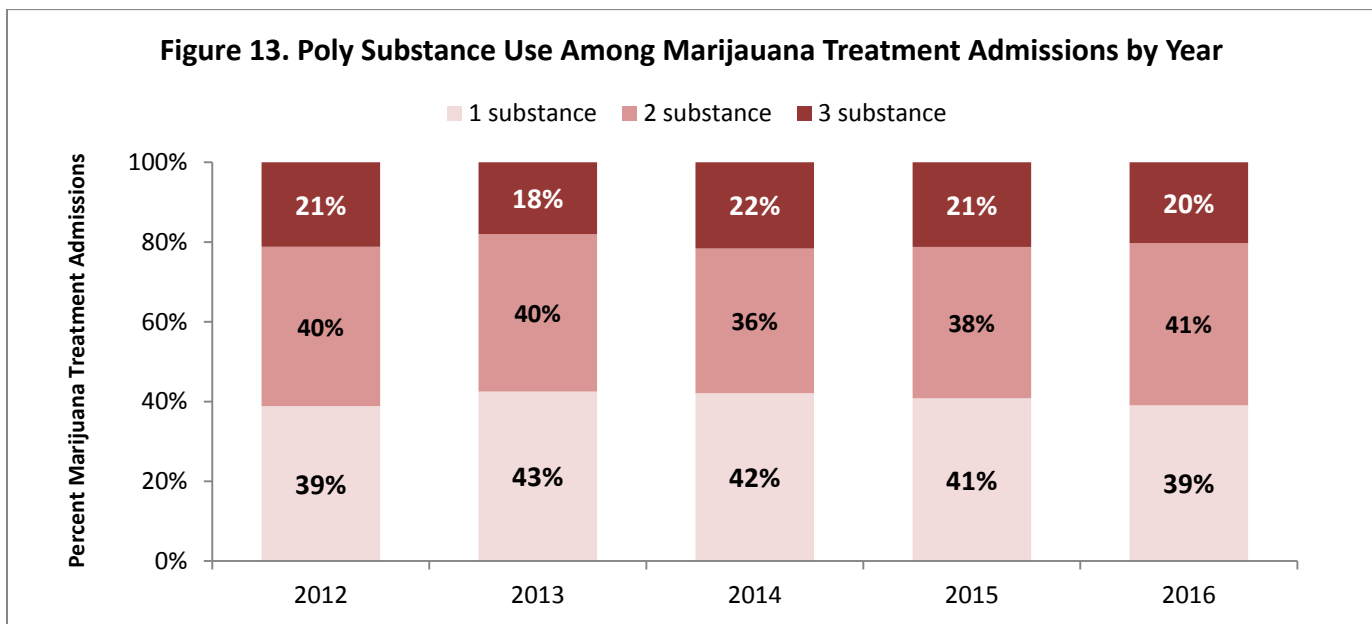


Figure 12b excludes the primary referral source to better visualize temporal trends among less common referral organizations. Roughly half of marijuana treatment admissions were referred by non DUI criminal justice (51%) which is a criminal justice issue unrelated to driving while intoxicated such as parole or probation violations, marijuana possession, or public intoxication. No increases or decreases in non DUI criminal justice referrals are evident.

Following legalization, the percentage of referrals from DUI criminal justice has increased (11% in 2012 to 21% in 2016). There have also been notable decreases in the percentage of referrals from human services (12% in 2012 to 7% in 2016) and from individuals (self-referred) from 13% in 2012 to 8% in 2016.

## Poly Substance Use Trends in Marijuana Treatment

Figure 13 presents the percent of poly substance use among marijuana treatment admissions by year. The purpose of Figure 13 is to determine how common poly substance use is among marijuana treatment admissions and consider how poly substance use is different among marijuana admissions versus all admissions. About 41% of marijuana treatment admissions reported marijuana was their only substance of use, while 59% of treatment admissions reported poly substance use; 39% (n=2832) reported two substances of use and 21% (n=1500) reported three substances of use.



Among the 38% of marijuana treatment admissions who reported a secondary substance the top five substances included: alcohol (67%), crack cocaine (11%), methamphetamine (8%), nicotine (6%), or synthetic opiate (2%). From 2012 to 2016, there were decreases in the percentage of clients who reported nicotine (6% in 2012 to 3% in 2016). There were increases in the percentage of clients who reported methamphetamine (7% in 2012 to 10% in 2016).

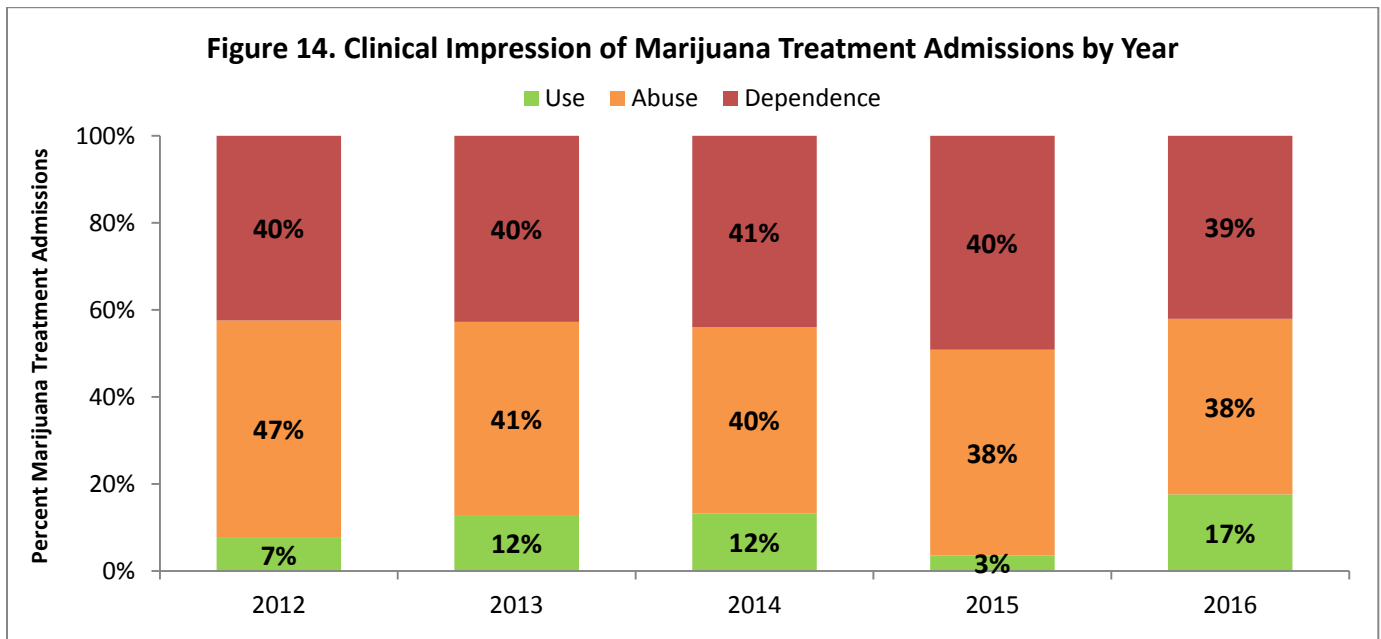
Among the 21% of marijuana treatment admissions who reported a third substance of abuse the top five substances included: nicotine (33.5%), crack cocaine (24%), alcohol (20%), methamphetamine (7%), and hallucinogens (3%). From 2012 to 2016, there were decreases in the percentage of marijuana treatment admission who reported crack cocaine

(30% in 2012 to 23% in 2016) or hallucinogens (4% in 2012 to 1% in 2016). There were large increases in the percentage of marijuana treatment admissions who reported methamphetamine (3% in 2012 to 8% in 2016).

### Drug Abuse and Misuse Trends in Marijuana Treatment

During the admission process, clinicians at the treatment facility categorize each reported substance as use, abuse, or dependence, based on guidance from the Diagnostic and Statistical Manual of Mental Disorders DSM-IV-TR. A treatment admission is identified as “use” if the client uses the substance but is not yet abusing or dependent upon the substance. A treatment admission is defined as “abuse” if the client is abusing the substance according to the definition of abuse in the DSM-IV-TR. A treatment admission is defined as “dependence” if the client is abusing the substance according to the definition of dependence in the DSM-IV-TR.

Figure 14 shows the percent of use, abuse, and dependence among marijuana treatment admissions by year. The purpose of Figure 14 is to describe how marijuana treatment admissions are clinically categorized and explore any potential changes after legalization. The majority of marijuana treatment admissions are classified as abusing marijuana (41%) or dependent on marijuana (40%). From 2012-2016, there was a 19% change in the percentage of treatment admissions classified as abusing (47% in 2012 to 38% in 2016). There was a 142% change in the percentage of treatment admissions classified as using (7% in 2012 to 17% in 2016). The percentage of marijuana treatment admissions classified as dependent has remained flat.



Note. Annually about 7% of marijuana treatment admissions clinical impressions are unknown.

### Implications and Recommendations

This report explored demographics of all drug and alcohol treatment admissions and marijuana treatment admission from 2012-2016 in Denver County.

One key take away is while efforts to address marijuana use and dependency, alcohol accounts for the largest proportion of treatment admission in Denver County. Over 70% of treatment admissions are primarily attributed to alcohol while marijuana is the primary substance attributed to less than 10% of treatment admissions. Future preventive efforts focused on substance use could target alcohol misuse and abuse among both youth and adults.

This report identified a notable and concerning increase in methamphetamine treatment admissions which may necessitate further focused monitoring. Among primary, secondary, and tertiary reported substances, methamphetamine consistently appeared as a growing cause for treatment admission.

Substance use is being initiated before the age of 18 for most treatment admissions. This is even more relevant among marijuana treatment admissions where over 80% of treatment admissions reported initiating use of marijuana before the age of 18. Additional efforts should help support the prevention of substance use among youth.

Considering marijuana treatment admissions specifically, males are more likely to receive treatment for marijuana compared to females. This could be in part because a large portion of individuals are admitted through the justice system and males are more likely to be arrested and charged. The percentage of marijuana treatment clients under the age of 18 has decreased while there has been an increase in treatments among clients 26-40 years of age.

Looking at the racial ethnic composition of marijuana admissions compared to all admissions, there are more Hispanics and Black, non-Hispanics referred to treatment for marijuana compared to non-Hispanic white. Additional research should examine these differences to help guide prevention efforts.

## Limitations

The DACODS data captures treatment admissions to licensed substance use disorder programs that receive public funding and therefore is not representative of programs that are privately funded.

DACODS data is treatment episode based meaning the sample size (n) is a reflection of unique treatment admissions and not the number of unique patients. DACODS data is collected at admission and the client has the option to decline answers to any questions which limits the completeness of some variables.

Information in this report is based on treatment admissions primary substance which is has limitations due to the likelihood of poly substance use in this population.

## Acknowledgements

This analysis and report were completed in partnership with the City of Denver and Denver Department of Public Health and Environment.