

What Denver is saying about Marijuana on twitter, 12/13/2018, ~11PM

# Colorado Marijuana Project

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PRACTICUM II

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# Discussion Points

- ▶ Purpose
- ▶ History of Cannabis in CO
- ▶ Sales
- ▶ Taxation
- ▶ Denver Crime
- ▶ Sentiment Analysis
- ▶ Conclusions & Further Study
- ▶ Links

# Purpose of Project

Colorado is one of ten states that have legalized marijuana for recreation use and one of 32 states to allow marijuana for medicinal purposes. In Colorado, marijuana has become a billion dollar a year business generating hundreds of millions of dollars in tax revenue. Additionally, as all marijuana growth, cultivation, packaging, transportation, and sales occur within Colorado, all business expenses are generated locally, and all profits are kept in the state.

**Goal:** This is an ongoing study of the impact of Marijuana on Colorado in revenue, taxation, and crime.

As Denver is the most populated city (705K in 2017) and accounts for the highest medical (49% or 202M) and recreational marijuana sales (34% or 375M), it will be used to examine the impact of cannabis on crime.

# Colorado Cannabis History



March 2017 – Cannabis Prohibition Begins



November 2000 – Amendment 20 (Medical Marijuana) passes with 54% approval allowing adults 18+ to be prescribed medical marijuana by a licensed physician



November 2012 – Amendment 64 (Retail Marijuana) passes allowing adults 21+ to purchase marijuana for recreational purposes

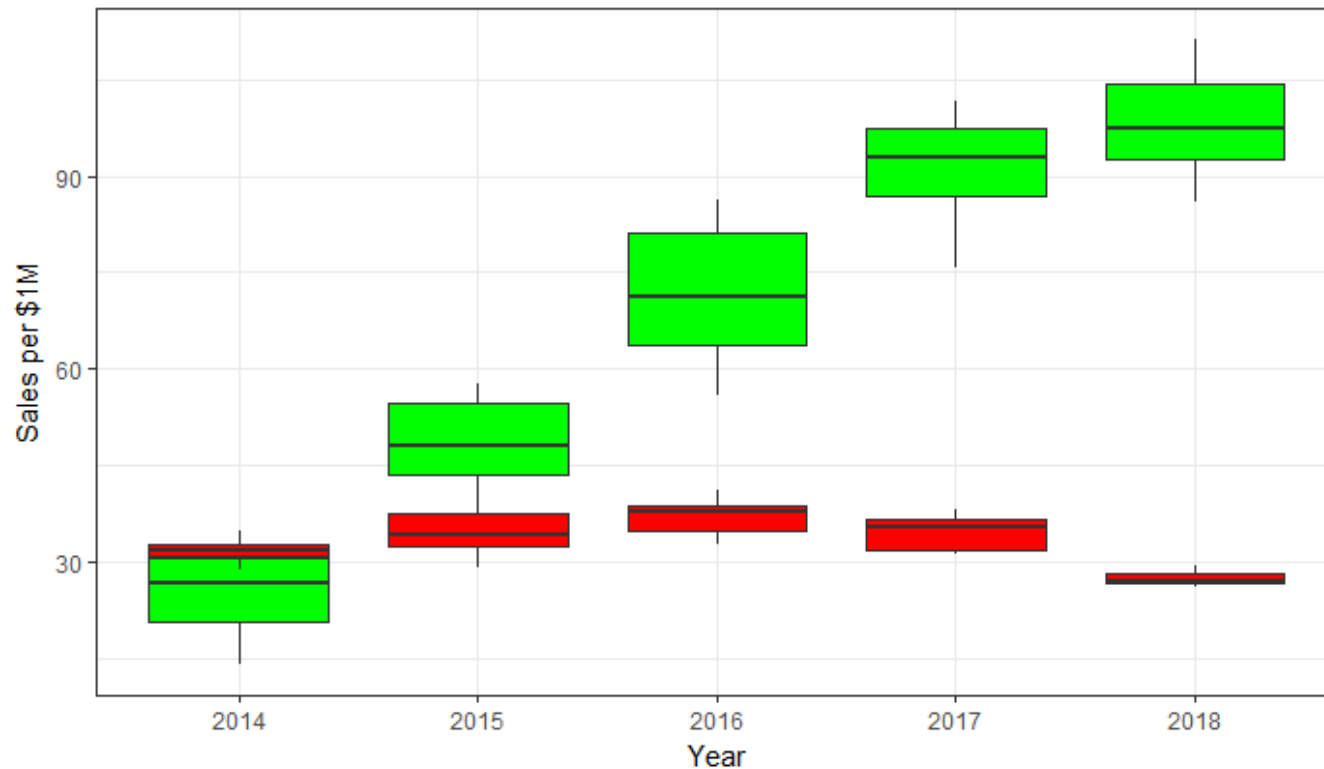
*\*Federal law still classifies Marijuana as a Schedule I drug along with heroin, bath salts, and LSD*



January 2014 – Retail Cannabis Sales begin - effectively ending the period of prohibition statewide although each municipality still determines its local legality and taxes

*\*April 2017 – 96 of 272 (36%) of Colorado Municipalities allow recreational Marijuana sales*

Colorado Retail and Medical Marijuana Sales 2014-2018



# Colorado Marijuana Sales\*

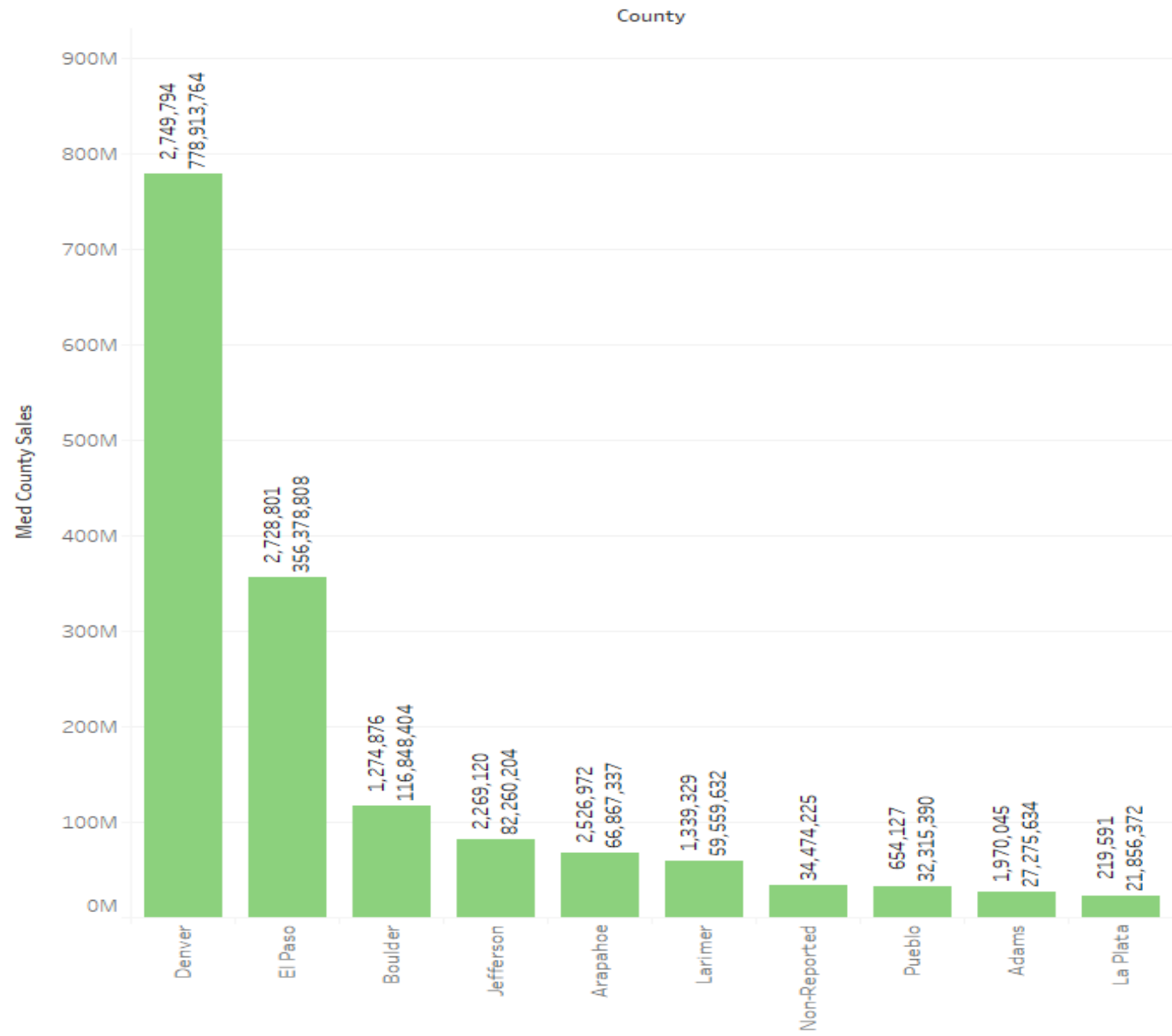
Retail sales are increasing year over year

Medical sales are generally flat but appear to be on the decline

*\*2018 sales represent sales to date as of August, 2018*



# Colorado Medical Sales by County (2014-2017)



Sum of Med County Sales for each County. The marks are labeled by sum of County Population and sum of Med County Sales. The data is filtered on Year, which ranges from 2014 to 2017. The view is filtered on sum of Med County Sales, which ranges from 20,000,000 to 778,913,764.

Denver, El Paso (Colorado Springs), and Boulder counties represent **~30%** of the states population and **~79%** of medical marijuana sales:

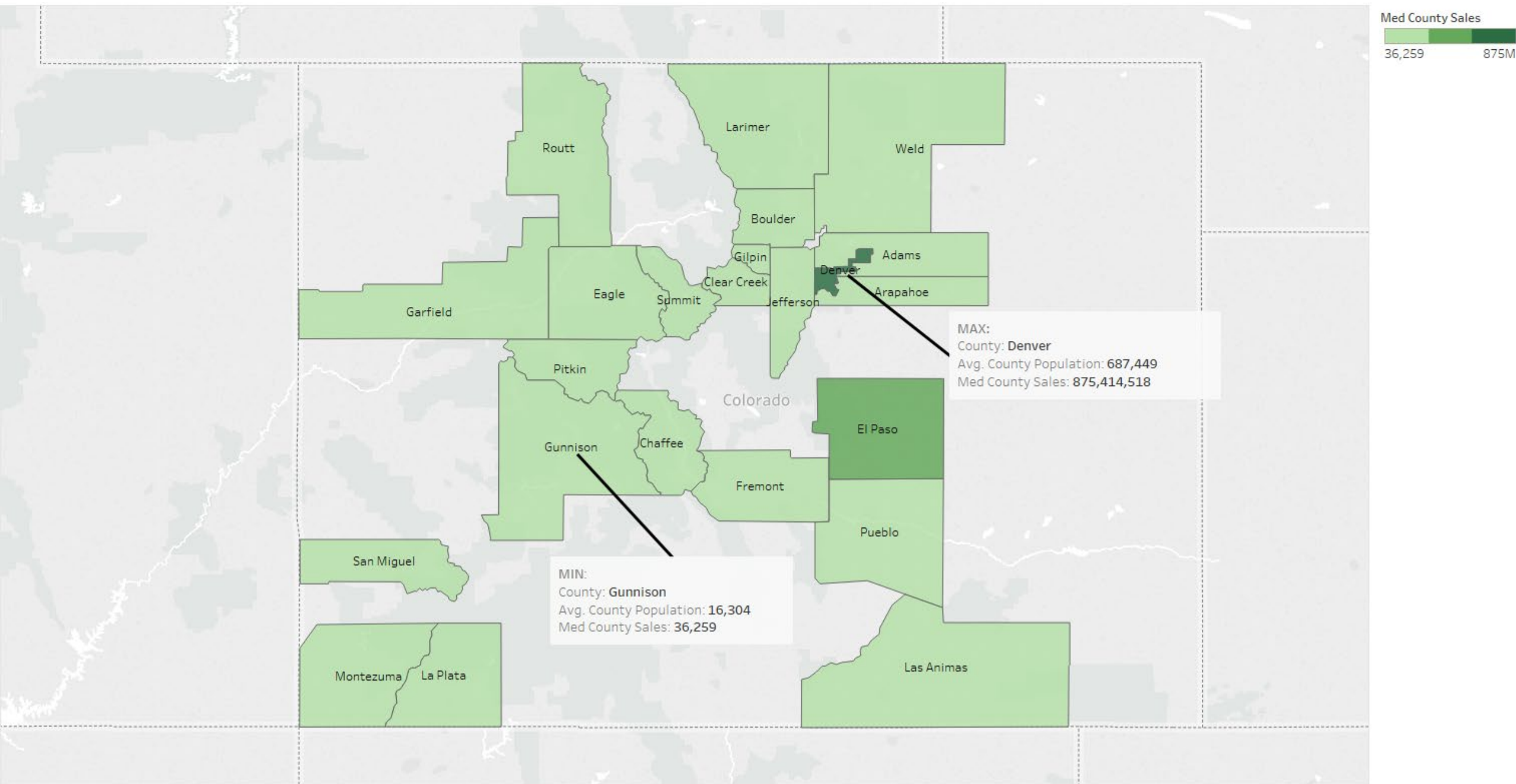
2017:

CO Med Cannabis sales: **\$416,516,818**  
Denver, El Paso, and Boulder sales: **\$327,464,527**

CO Population: **5,609,421**  
Denver, El Paso, and Boulder counties population: **1,729,788**

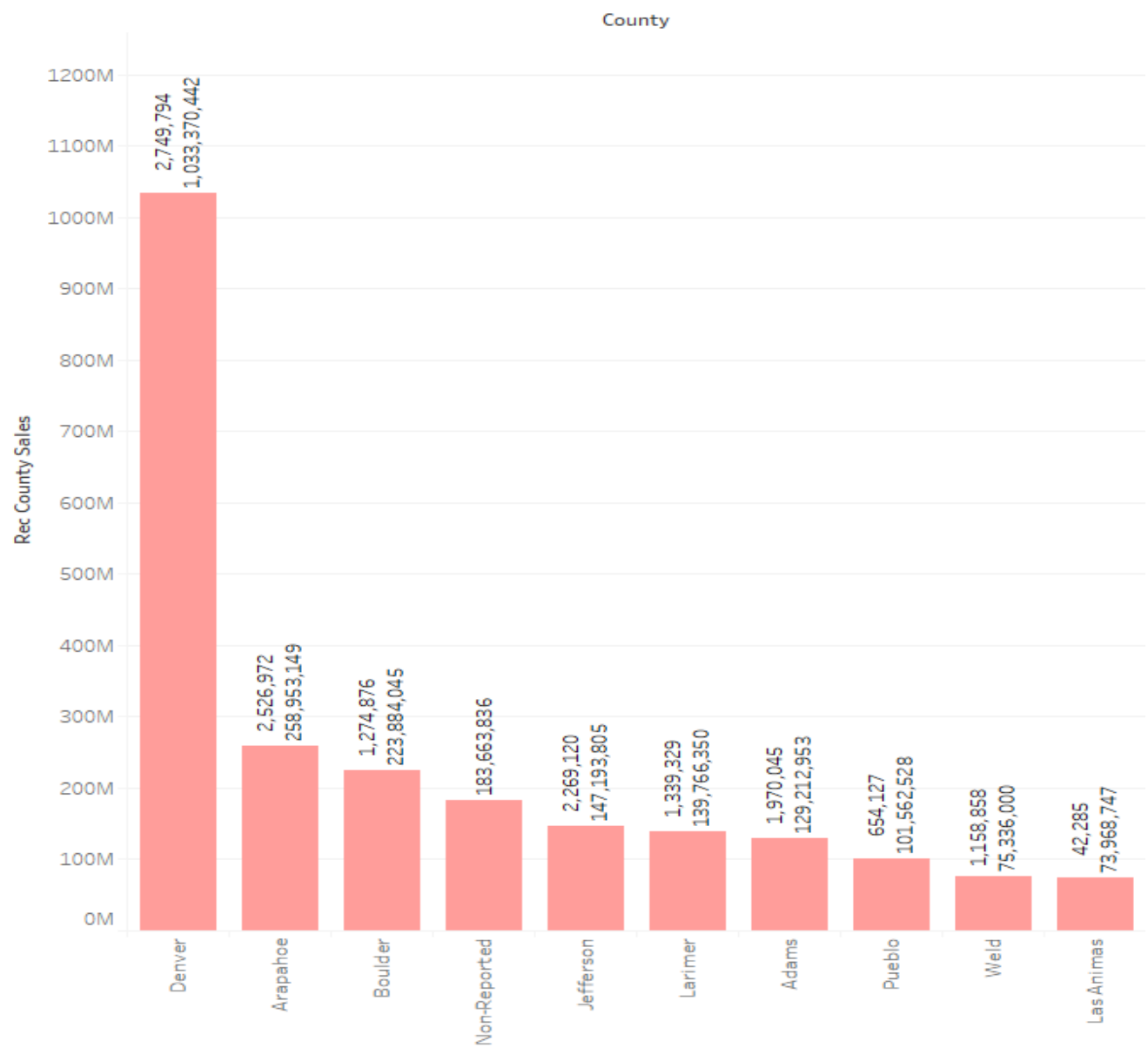
Denver: 12.6% population, 48.7% sales  
El Paso: 12.5% population, 24.5% sales  
Boulder: 5.7% population, 5.3% sales

# Choropleth of Colorado Medical Marijuana Sales



Map based on Longitude (generated) and Latitude (generated). Color shows sum of Med County Sales. The marks are labeled by County. Details are shown for State and County. The data is filtered on Medical Sales Description, which keeps

# Colorado Recreational Sales by County (cum. 2014-2017)



Sum of Rec County Sales for each County. The marks are labeled by sum of County Population and sum of Rec County Sales. The data is filtered on Year, which ranges from 2014 to 2017. The view is filtered on sum of Rec County Sales, which ranges from 70,000,000 to 1,033,370,442.

Denver, Arapahoe, and Boulder counties represent **~40%** of the states population and **~52%** of recreational marijuana sales:

2017:

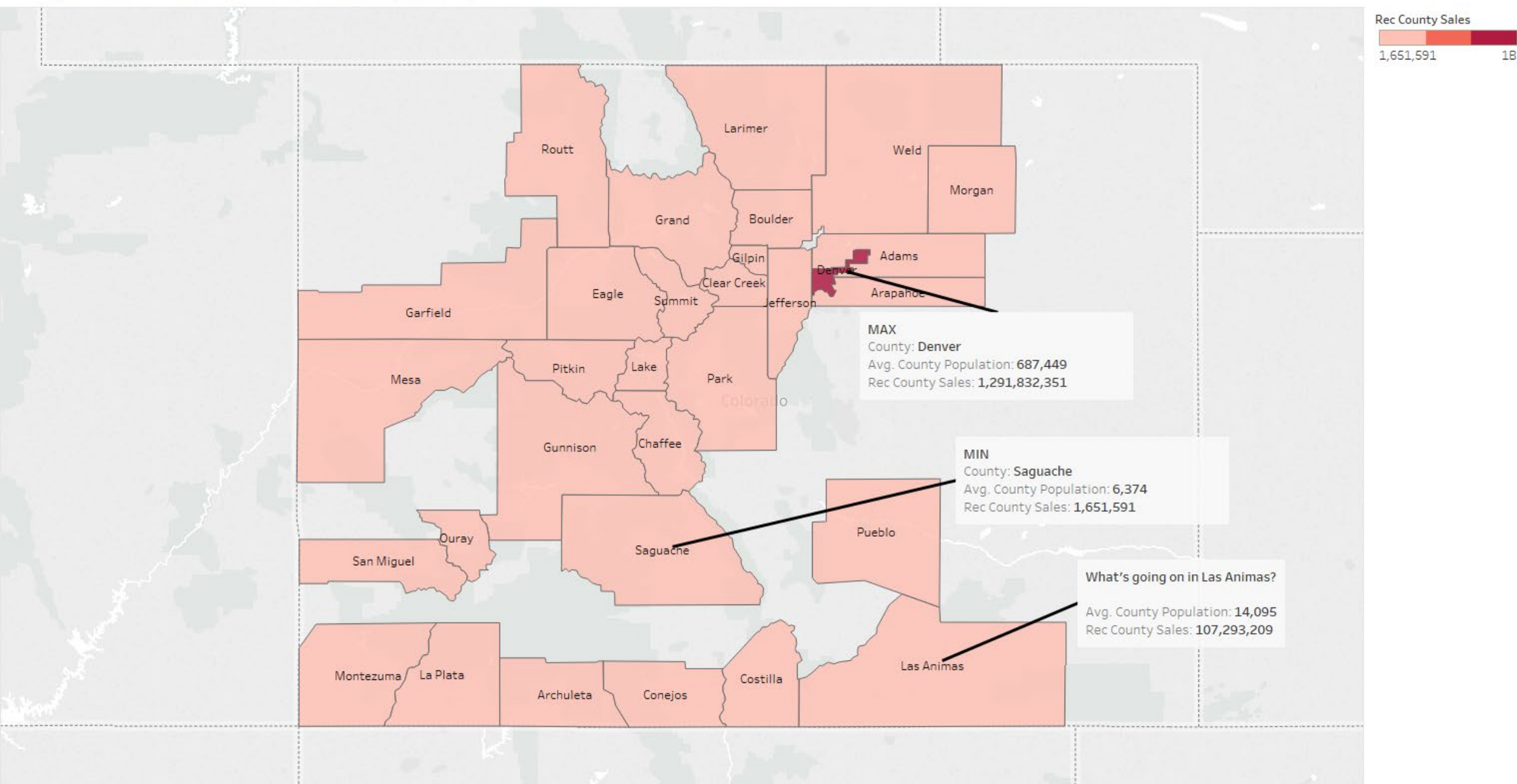
CO Rec Cannabis sales: **\$1,089,778,095**  
Denver, Arapahoe, and Boulder sales: **\$563,948,132**

CO Population: **5,609,421**  
Denver, Arapahoe, and Boulder counties population: **1,671,762**

Denver: 12.6% population, 34% sales  
Arapahoe: 11.4% population, 10% sales  
Boulder: 5.7% population, 7% sales

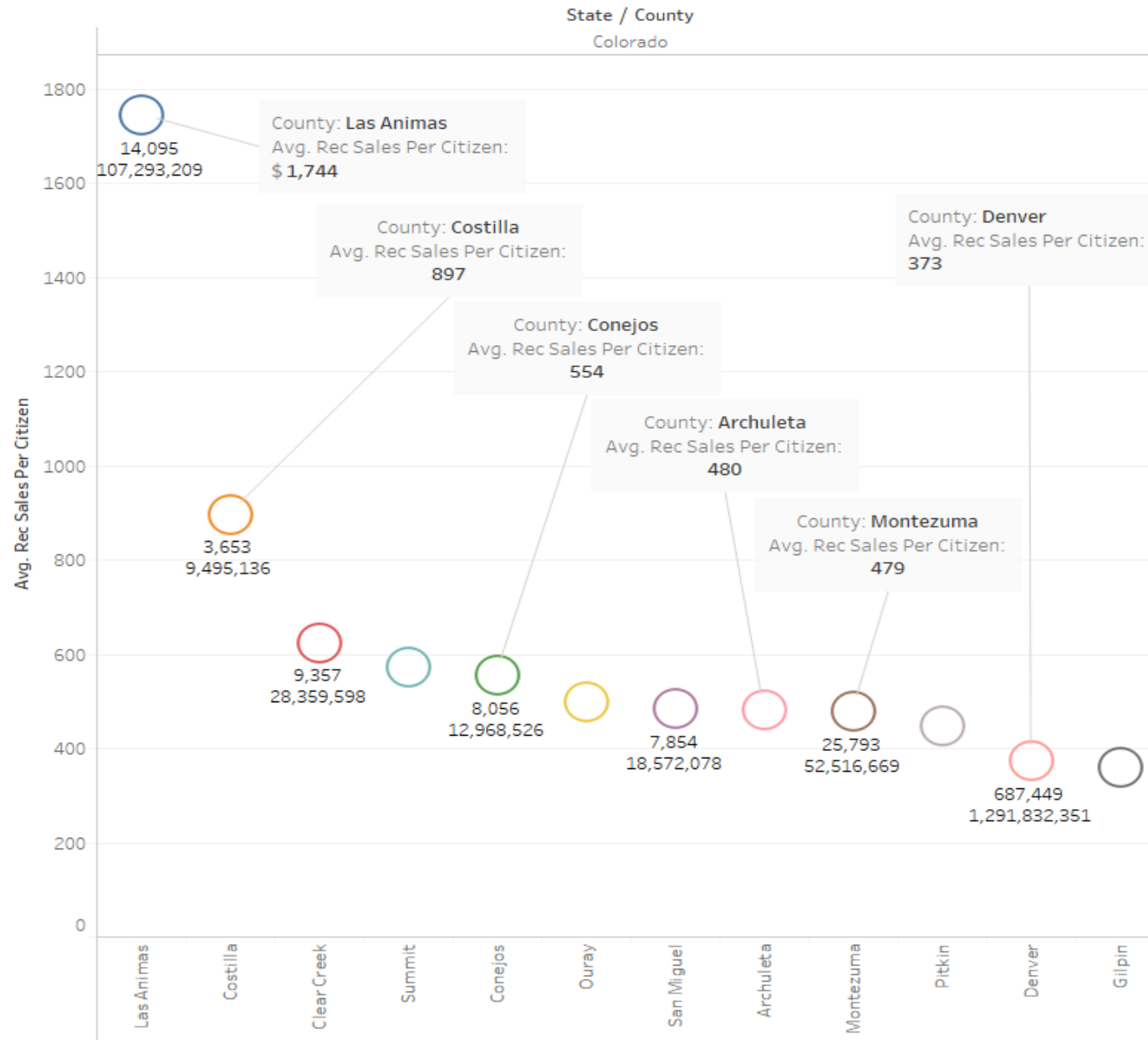


# Choropleth of Colorado Recreational Marijuana Sales - 2014



Map based on Longitude (generated) and Latitude (generated). Color shows sum of Rec County Sales. The marks are labeled by County. Details are shown for State and County. The view is filtered on sum of Rec County Sales, which ranges from 100 to 1,291,832,351.

## Average \$ Spent on Recreational Marijuana per Citizen, per County



Average of Rec Sales Per Citizen for each County broken down by State. Color shows details about County. The marks are labeled by average of County Population and sum of Rec County Sales. The view is filtered on average of Rec Sales Per Citizen, which ranges from 300 to 1,744.

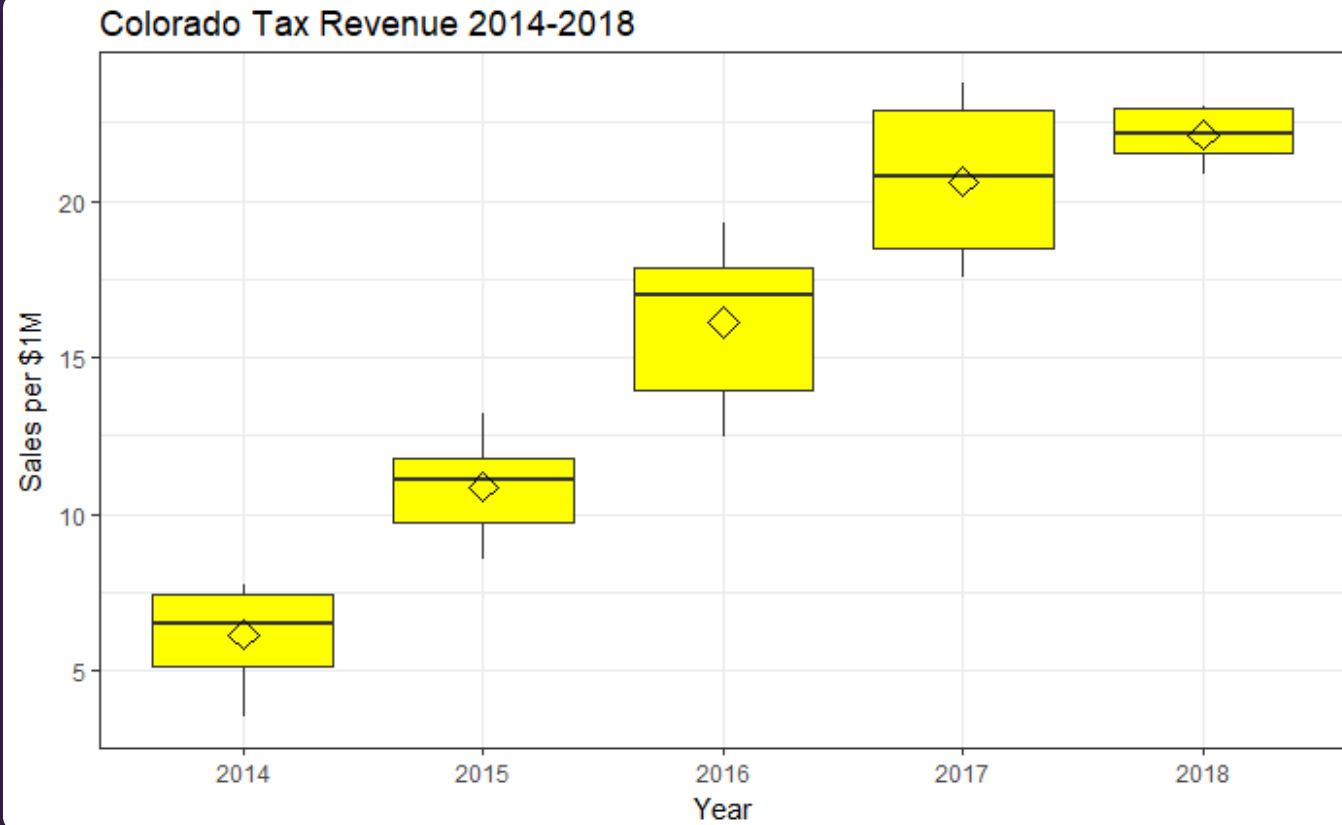
## The Curious Case of Las Animas...

Las Animas stands out for having a low county population (14K) compared to high recreational marijuana sales (107M)

At issue is that the average cost of marijuana per county citizen is 4X+ the cost of marijuana in Denver

Las Animas\* provides easy access to Kansas, Oklahoma, Texas, and New Mexico to recreational marijuana – the higher sales may be from out-of-staters visiting for the day

\*Costilla, Conejos, Archuleta, and Montezuma counties also provide easy access to New Mexico



# Colorado Tax Revenue

# Colorado Marijuana Taxation

## Medical Marijuana (3+%)

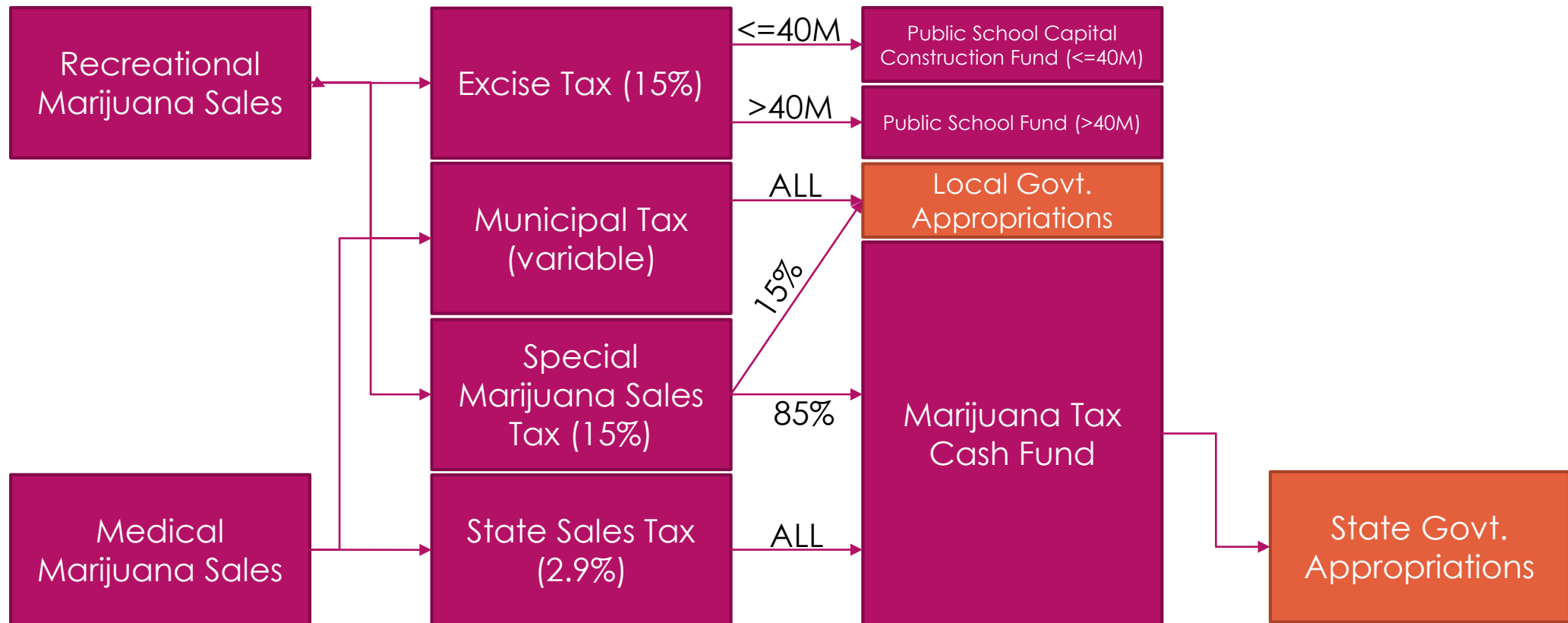
- ▶ **State Retail Excise Tax** (included in sales price): exempt
- ▶ **State Sales Tax:** 2.9%
- ▶ **State Retail Marijuana Sales Tax:** exempt
- ▶ **Local and Special Districts Tax Rates:** varies by Municipality/District

## Recreational Marijuana (30+%)

- ▶ **State Retail Excise Tax:** 15%
- ▶ **State Sales Tax:** exempt as of July 1, 2017
- ▶ **State Retail Marijuana Sales Tax:** 15% as of July 1, 2017
- ▶ **Local and Special Districts Tax Rates:** varies by Municipality/District



# Where do the taxes go?

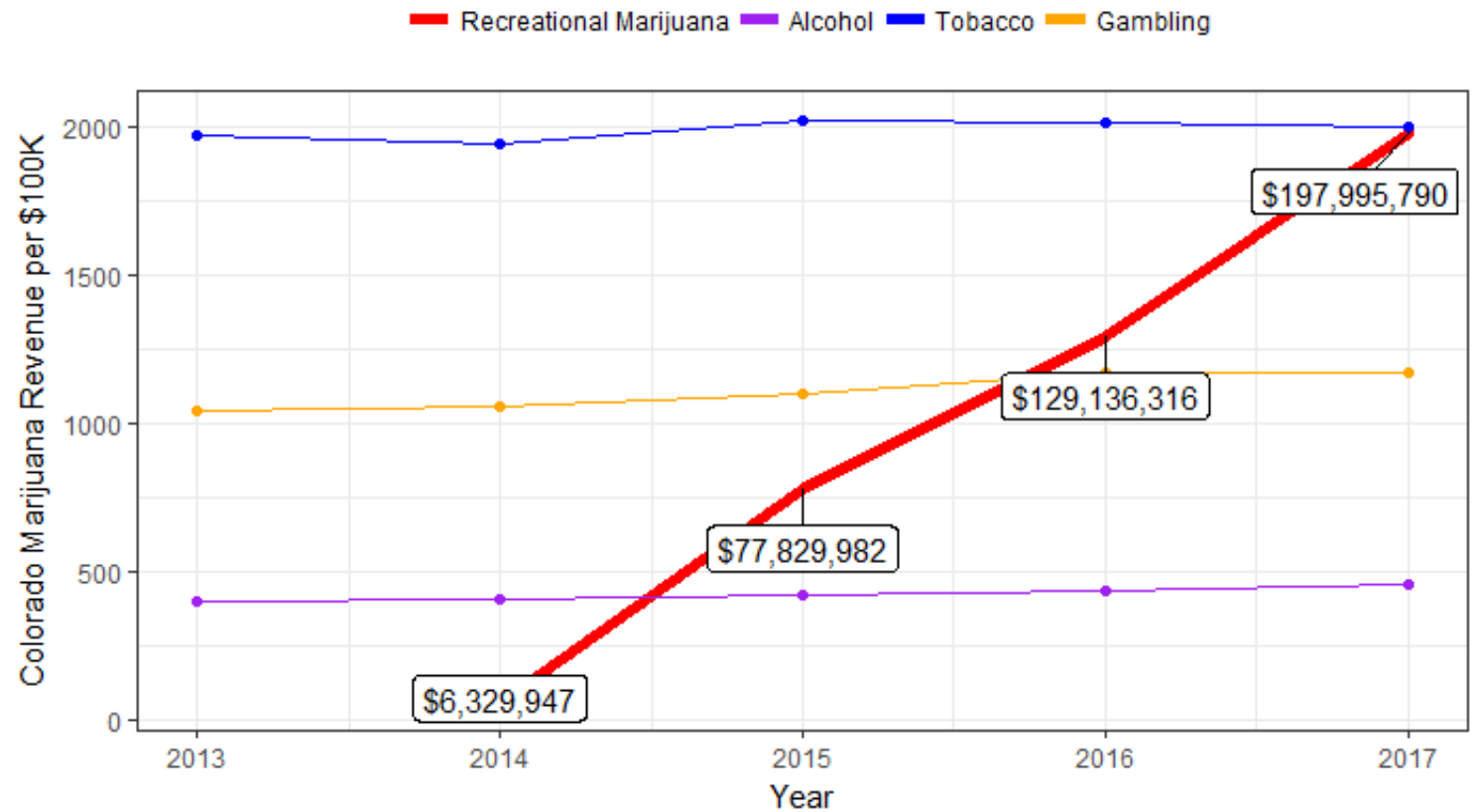




## Marijuana state revenue as compared to other Colorado behavior revenue sources

Comparisons of Colorado 'sin' Taxes 2013-2017

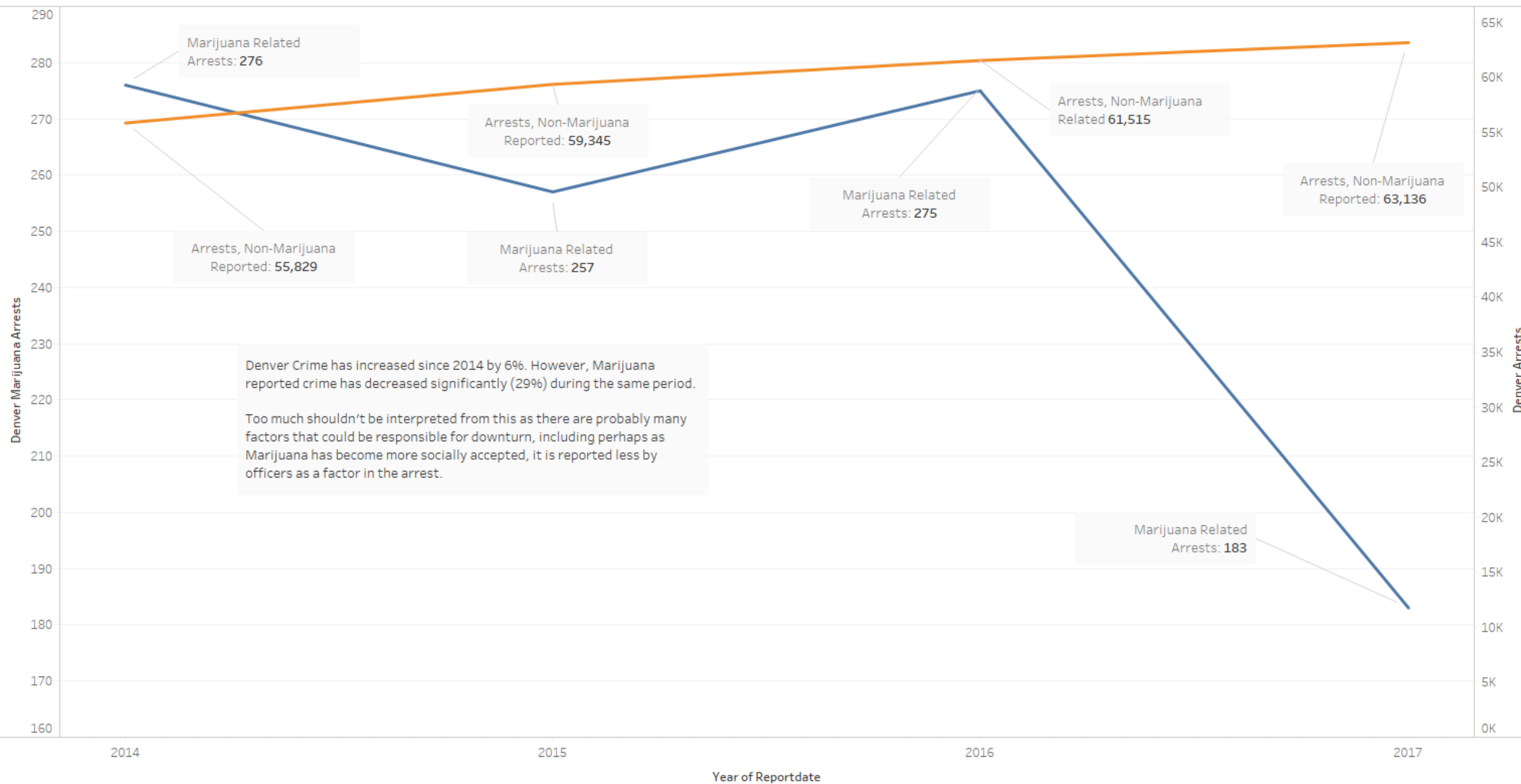
- ▶ Taxes from recreational marijuana sales exceeded taxes collected for
  - ▶ Alcohol: 2015
  - ▶ Gambling: 2016
  - ▶ Tobacco: on track to surpass in 2018



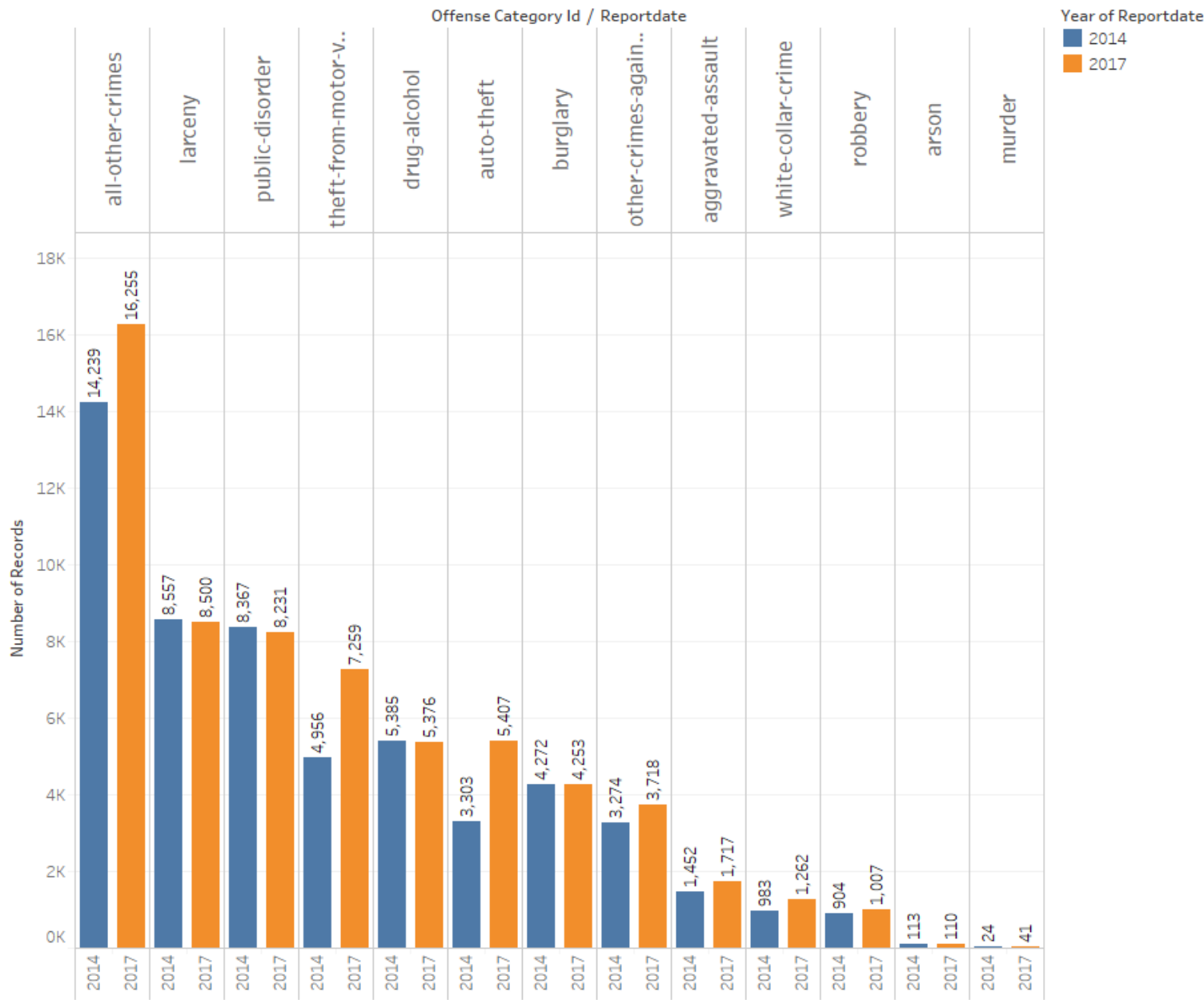
A wide-angle photograph of the Denver skyline, featuring numerous skyscrapers and buildings. In the background, a large, snow-capped mountain range is visible under a clear sky. The foreground shows some lower-rise buildings and trees. The text "Denver Crime" is overlaid in white on the left side of the image.

# Denver Crime

# Marijuana Crime vs. General Crime (Denver, Colorado)

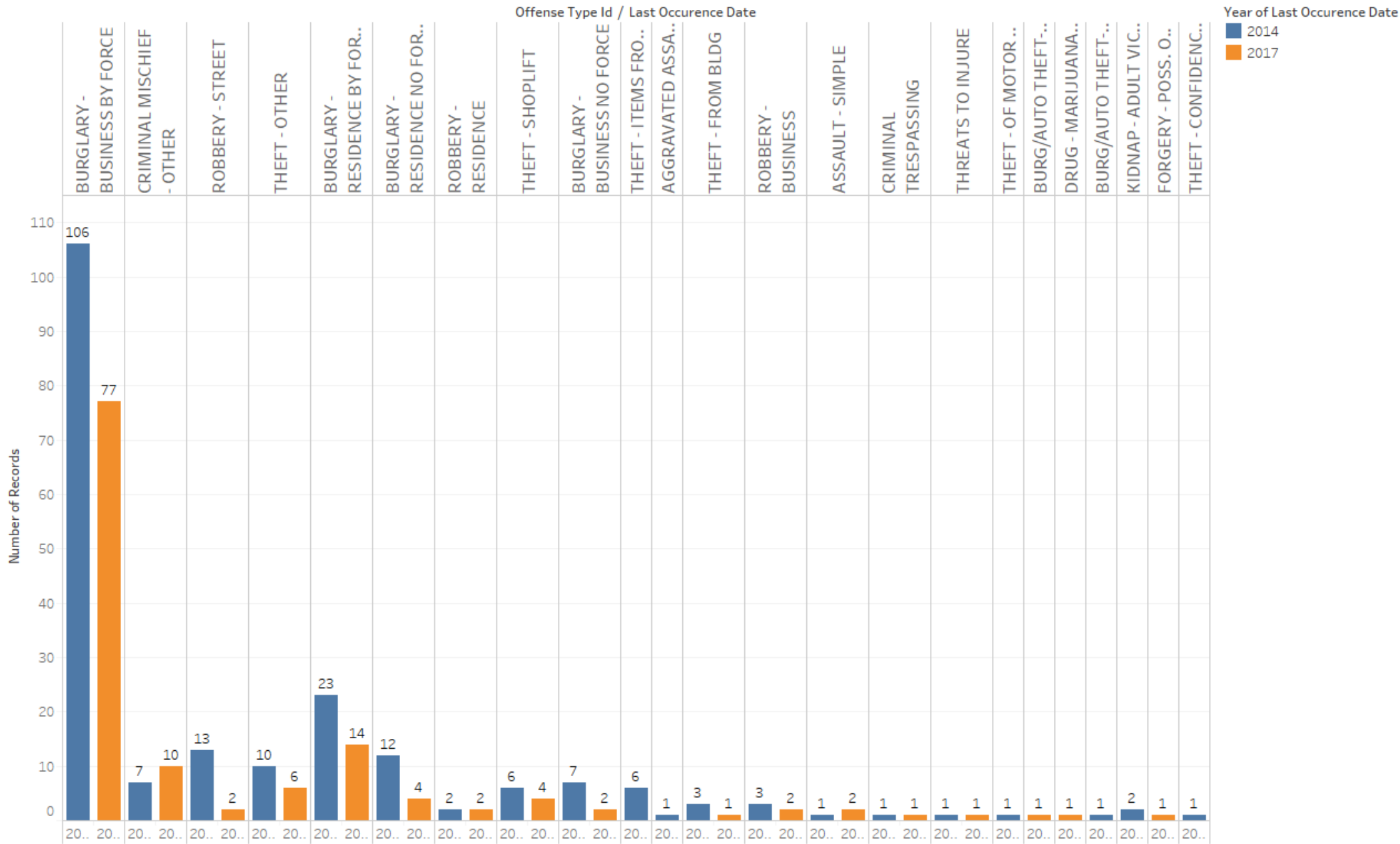


Comparison of Denver Crimes since Prohibition End



Sum of Number of Records for each Reportdate Year broken down by Offense Category Id. Color shows details about Reportdate Year. The view is filtered on Reportdate Year, which keeps 2014 and 2017.

Comparison of Denver crimes involving Marijuana



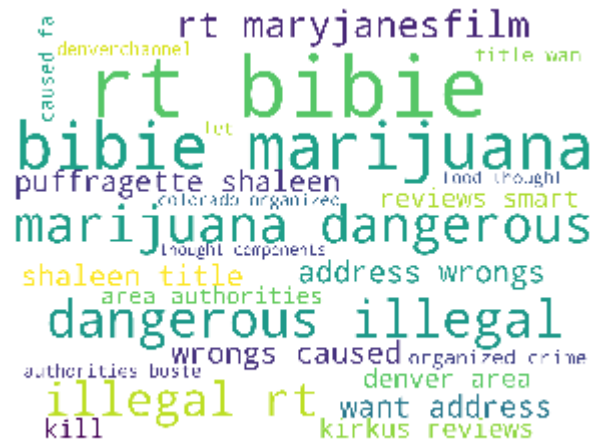
Sum of Number of Records for each Last Occurrence Date Year broken down by Offense Type Id. Color shows details about Last Occurrence Date Year. The view is filtered on Last Occurrence Date Year, which keeps 2014 and 2017.



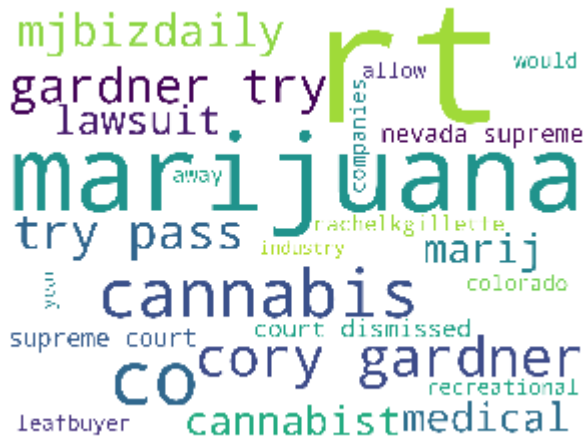
100

What Denver twitter users were saying about marijuana on 12/15/2018:

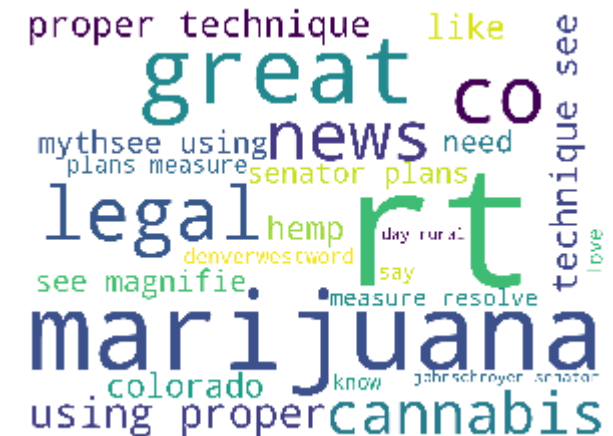
Negative



## All Tweets

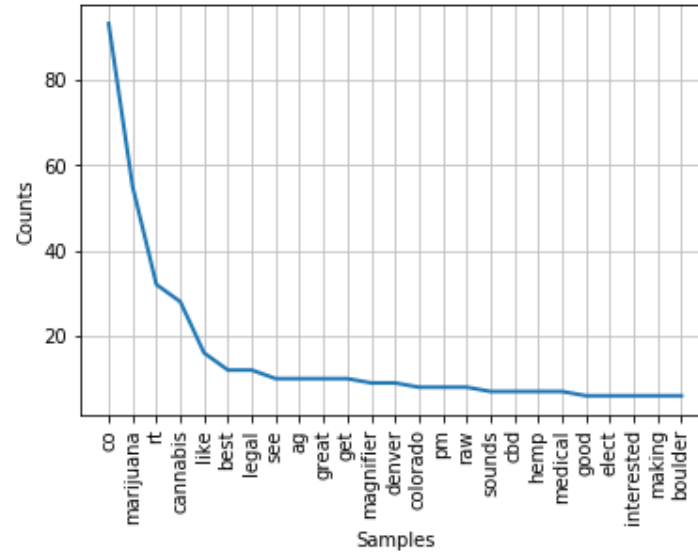


Positive

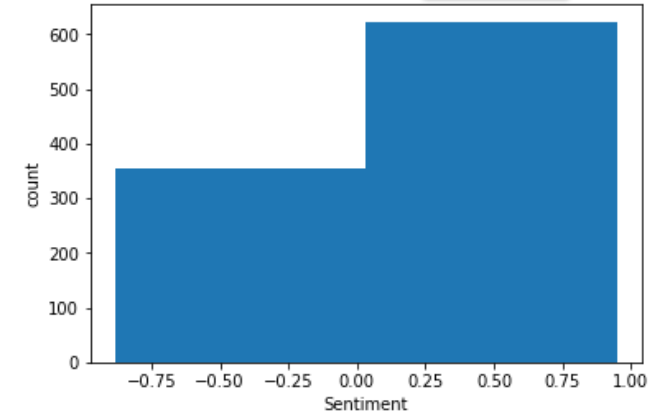


# Sentiment Analysis

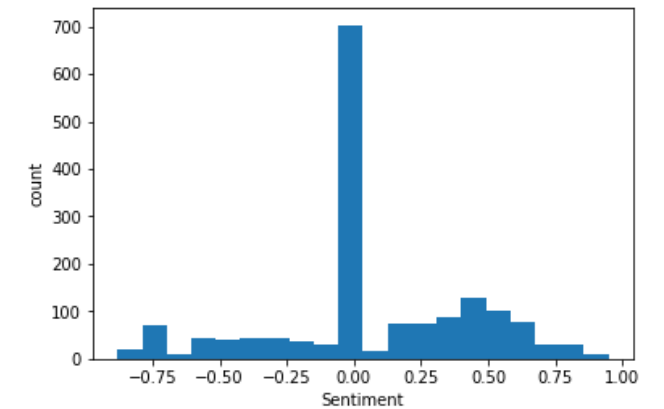
- ▶ Twitter Sentiment Analysis was performed on 1,664 tweets from the Denver city center (+15 miles) for the topic of Marijuana on Dec 15, 2018
- ▶ Most of the tweets were neutral (lower chart) but when neutrality was removed, tweet sentiment was generally favorable (upper chart) towards Marijuana



Text(0,0.5,'count')



Text(0,0.5,'count')



# Conclusions and Next Steps

- ▶ Too little longitudinal data exists to make any certain conclusions

# Links & Citations

- ▶ Github landing page: <https://github.com/davelovesdata/Colorado-Marijuana-Project>
  - ▶ Includes this presentation, supporting R, Python, and Tableau packages, and datasets
- ▶ Boulder Crime Statistics: <https://bouldercolorado.gov/police/crime-statistics>
- ▶ Denver Marijuana Licenses: <https://www.denvergov.org/opendata/dataset/city-and-county-of-denver-marijuana-active-business-licenses>
- ▶ Denver Marijuana Sales: <https://www.denvergov.org/opendata/dataset/city-and-county-of-denver-marijuana-gross-sales>
- ▶ Denver Marijuana Sales Tax: <https://www.denvergov.org/opendata/dataset/city-and-county-of-denver-marijuana-sales-tax>

# Links & Citations

- ▶ Denver Marijuana Crime:  
<https://www.denvergov.org/opendata/dataset/city-and-county-of-denver-crime-marijuana>
- ▶ Denver Crime: <https://www.denvergov.org/opendata/dataset/city-and-county-of-denver-crime>
- ▶ Colorado County Marijuana Sales:  
<https://www.colorado.gov/pacific/revenue/colorado-marijuana-sales-reports>
- ▶ Colorado County Tax Collections:  
<https://www.colorado.gov/pacific/revenue/colorado-marijuana-tax-data>



# Links & Citations

- ▶ Joint Budget Committee Appropriations Report, 2017-2018:  
<http://leg.colorado.gov/sites/default/files/fy17-18apprept.pdf>
- ▶ Population data: <https://demography.dola.colorado.gov/>