

Change in Crime Rate in WA State Since the Sale of Legalized Recreational Marijuana



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Research Questions

- Has there been a change in crime rate since the legalization of recreational marijuana in the state of WA? Is the change statistically significant?
- Are crime rates lower or higher in areas of higher marijuana sales or concentration of dispensaries at the county and/or county type level (urban, suburban, rural)?

Alternative Hypothesis:

If legalization of recreational marijuana affects crime rate, then there would be a significant difference in crime rate between before and after legalization of recreational marijuana.

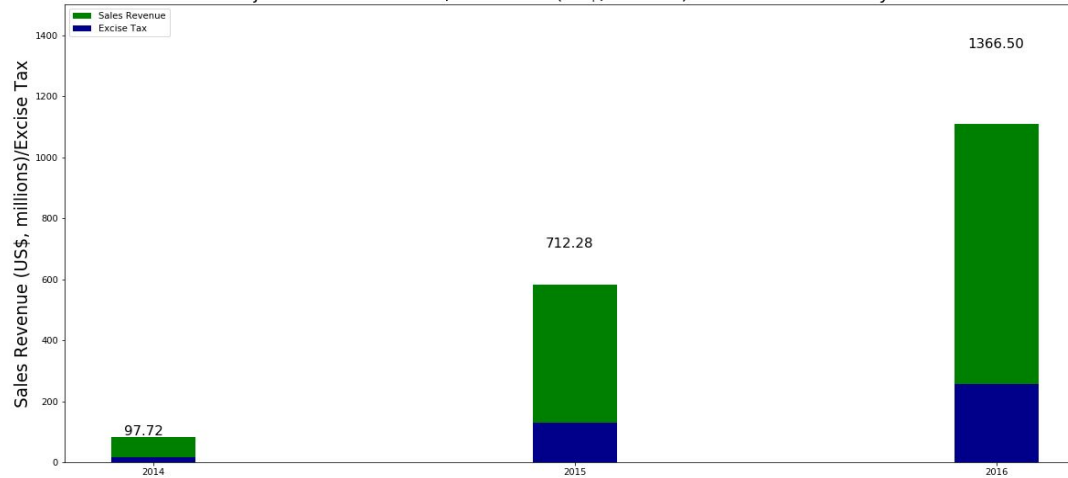
Null Hypothesis:

If legalization of recreational marijuana doesn't affect crime rate, then there would be no significant difference in crime rate before and after legalization of recreational marijuana.

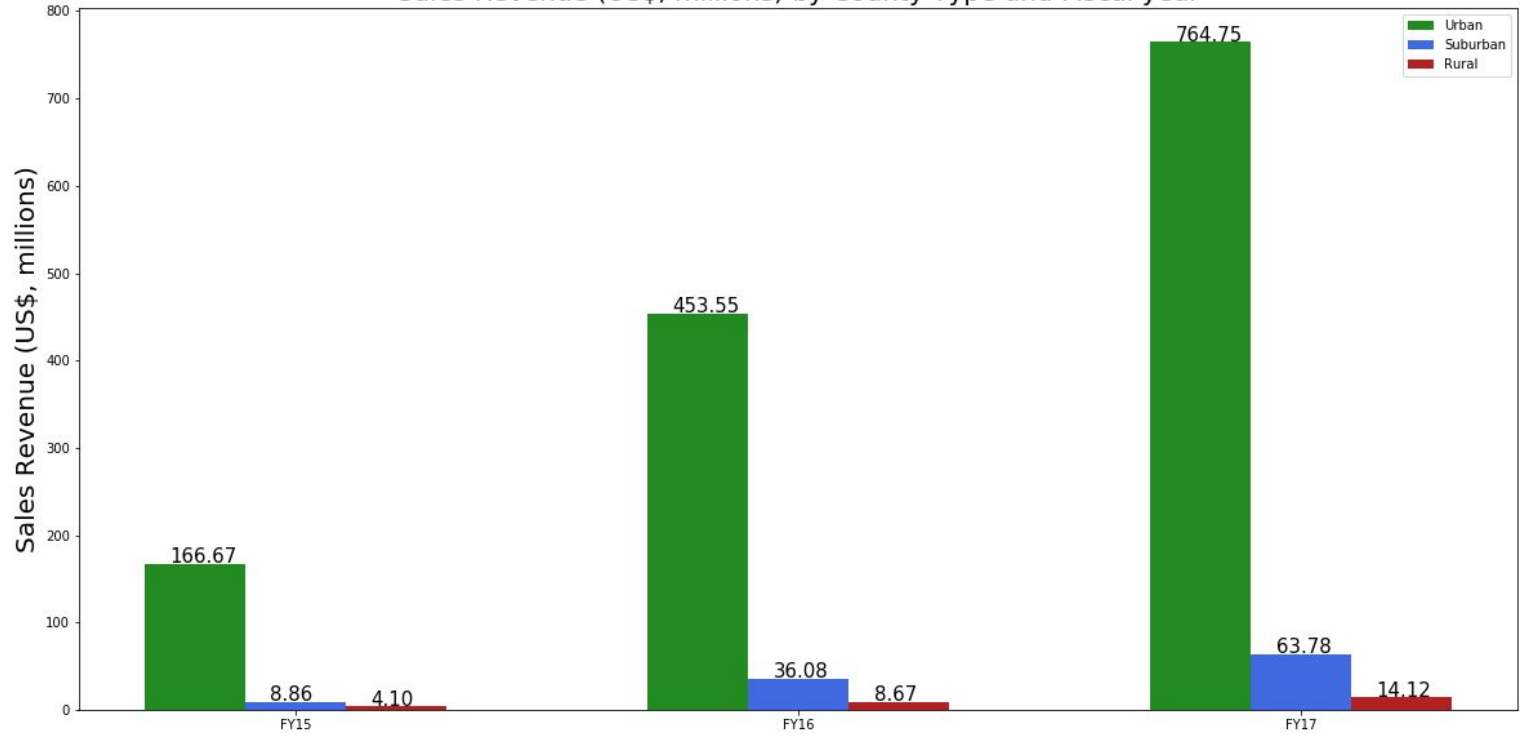
Marijuana Sales Revenue/Excise Tax (US\$, millions) in the State of WA Over Time



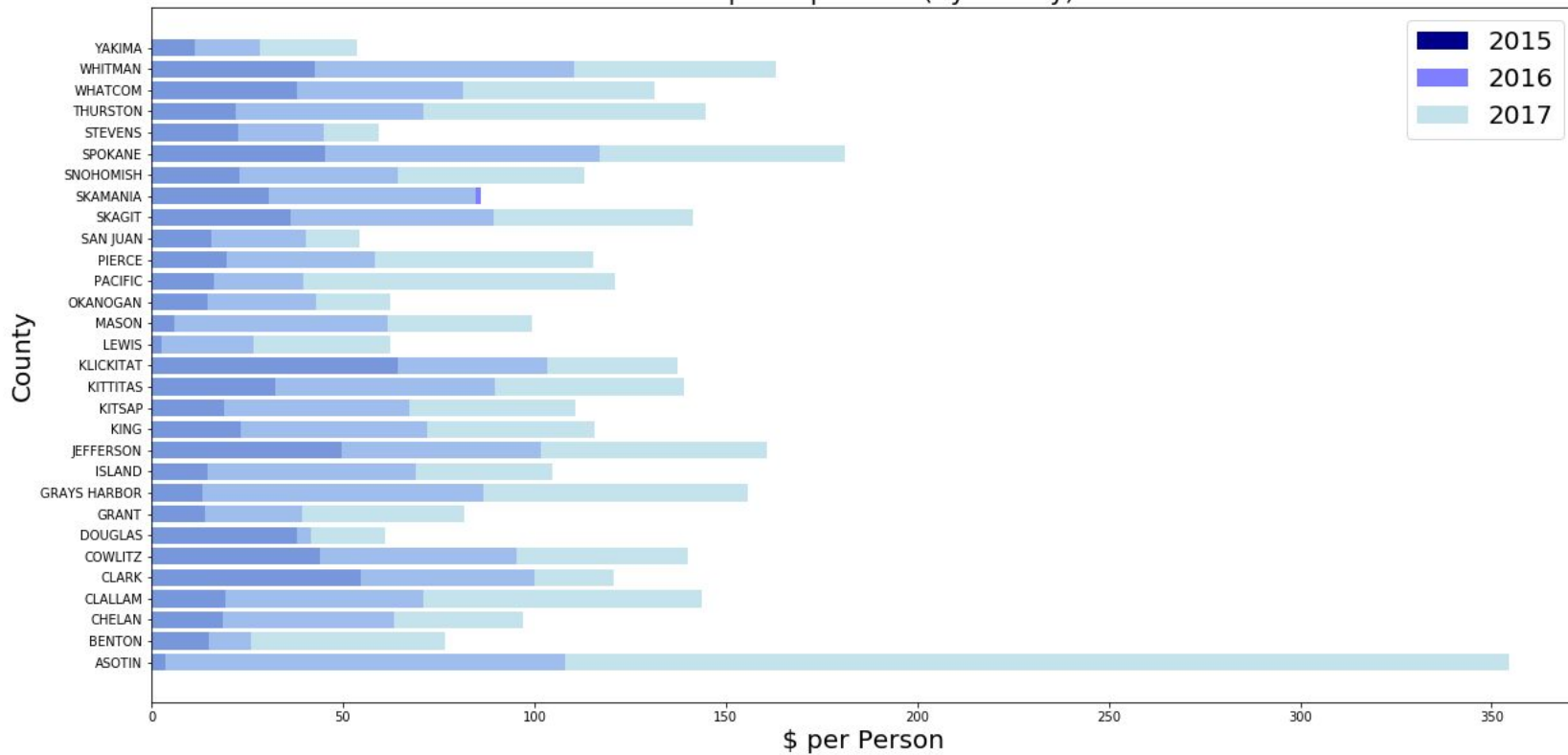
Marijuana Sales Revenue/Excise Tax (US\$, millions) in the State of WA by Year



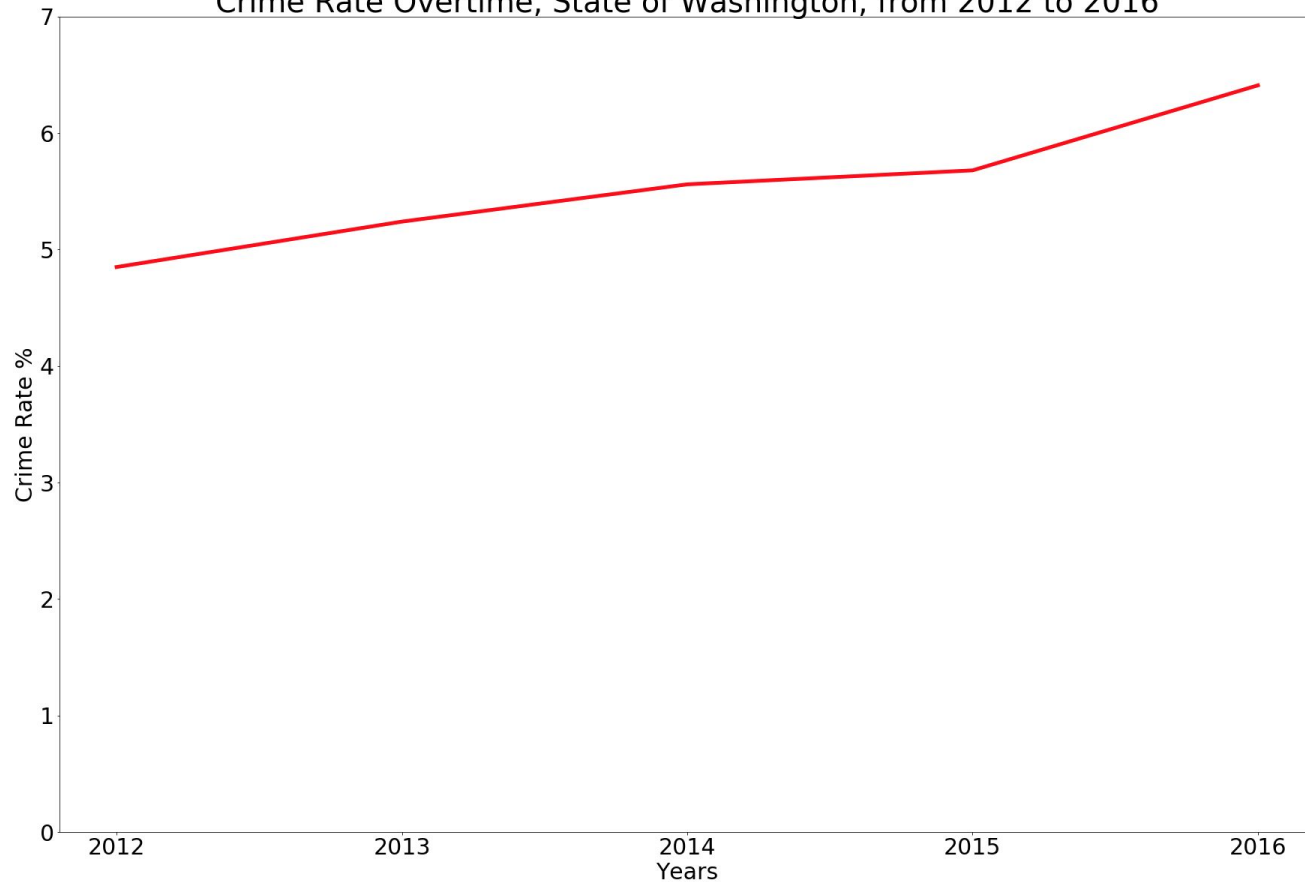
Sales Revenue (US\$, millions) by County Type and Fiscal year



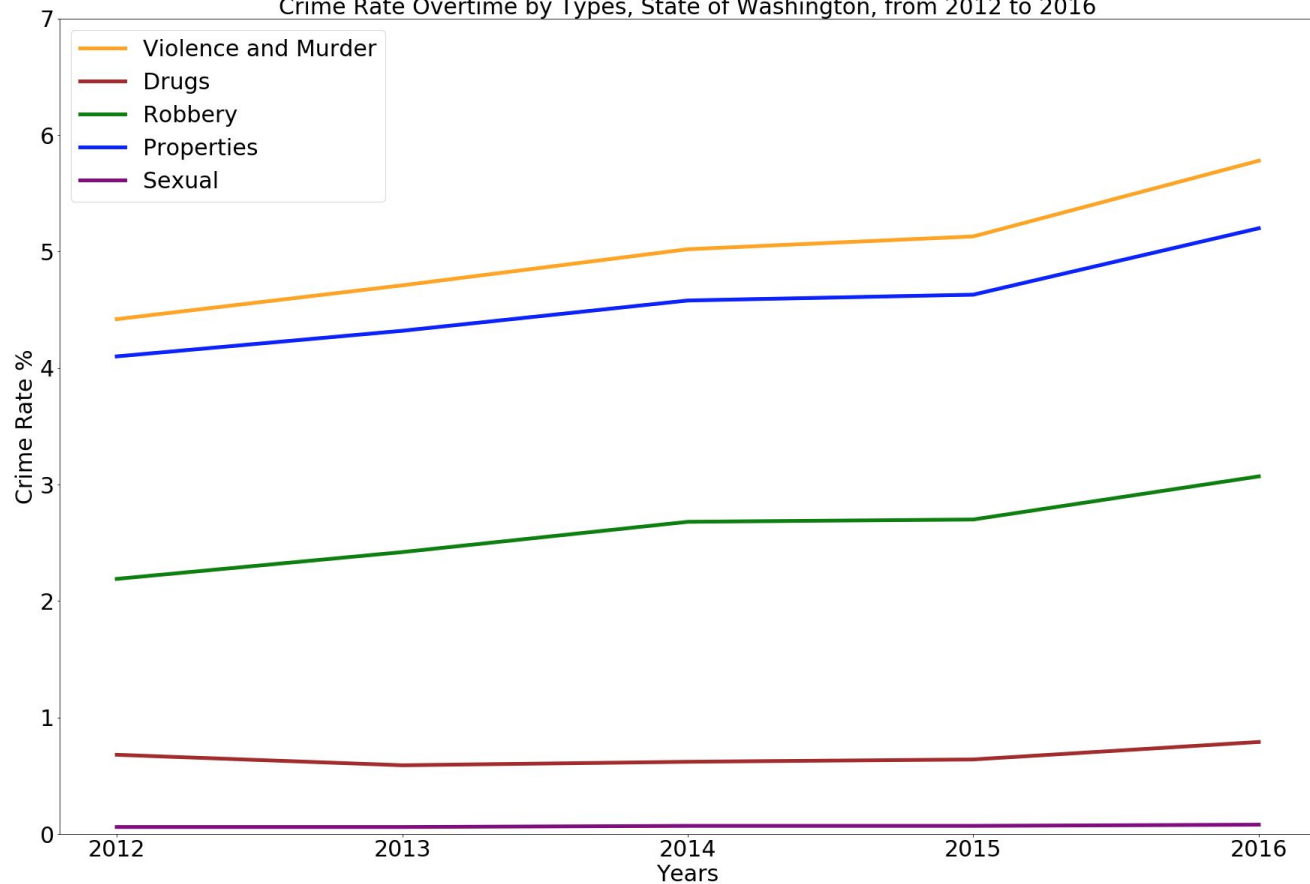
Sales per Population (By County)

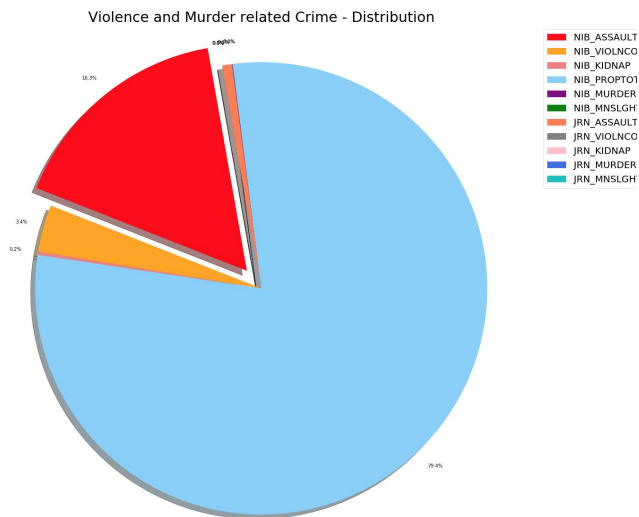


Crime Rate Overtime, State of Washington, from 2012 to 2016

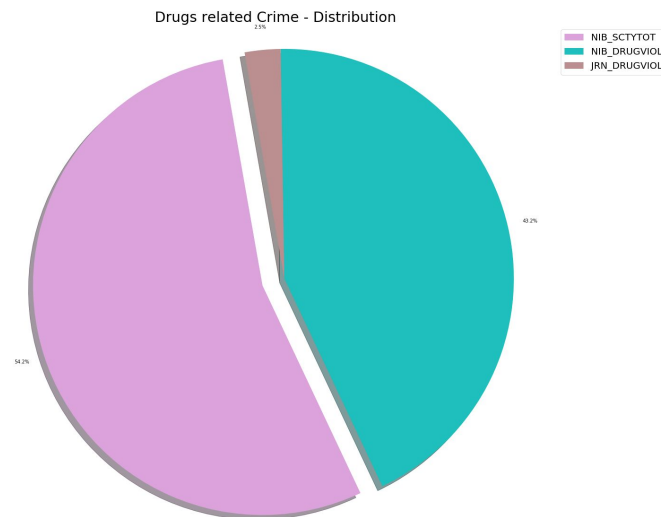


Crime Rate Overtime by Types, State of Washington, from 2012 to 2016





79.4% of the violence and murder related crime are “PROPTOT”, which includes blackmail, robbery, theft, and more crimes which violence and murder were involved.

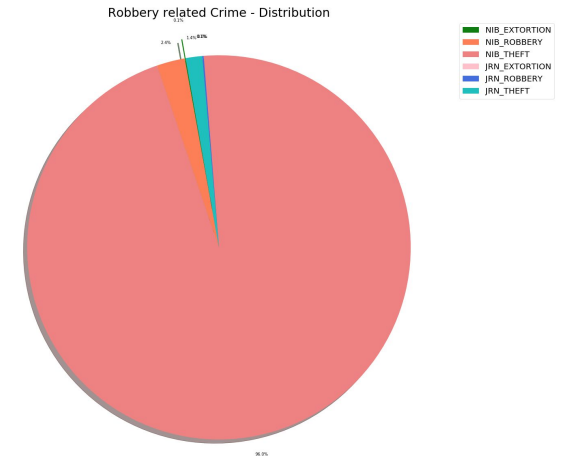
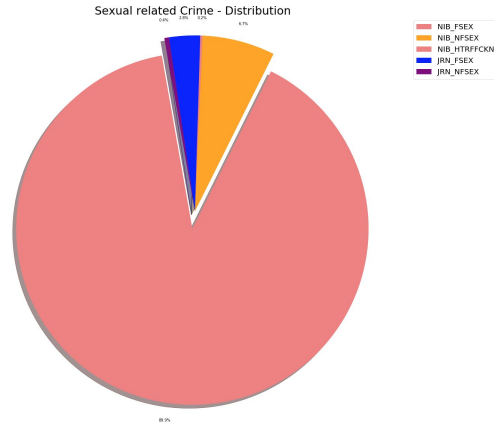


54.2% of the drugs related crime are “SCTYTOT”, which are drug violations reported as society offenses.



87.1% of the properties related crime are “PROPTOT”, which simply means property offenses.

89.9% of the sexual related crime are “FSEX”, which includes rape, sexual assault, and more.



96% of the drugs related crime are “EXTORTION”, which basically means unlawfully obtain money, property or any other valuables by threatening.



- 28.4 % of the state total crime happened in King County
- Adams County has the highest Crime % (Total Crime/ Total Population) of 10.05%

- 31.2 % of the state total crime happened in King County
- Adams County has the highest Crime % (Total Crime/ Total Population) of 11.09%



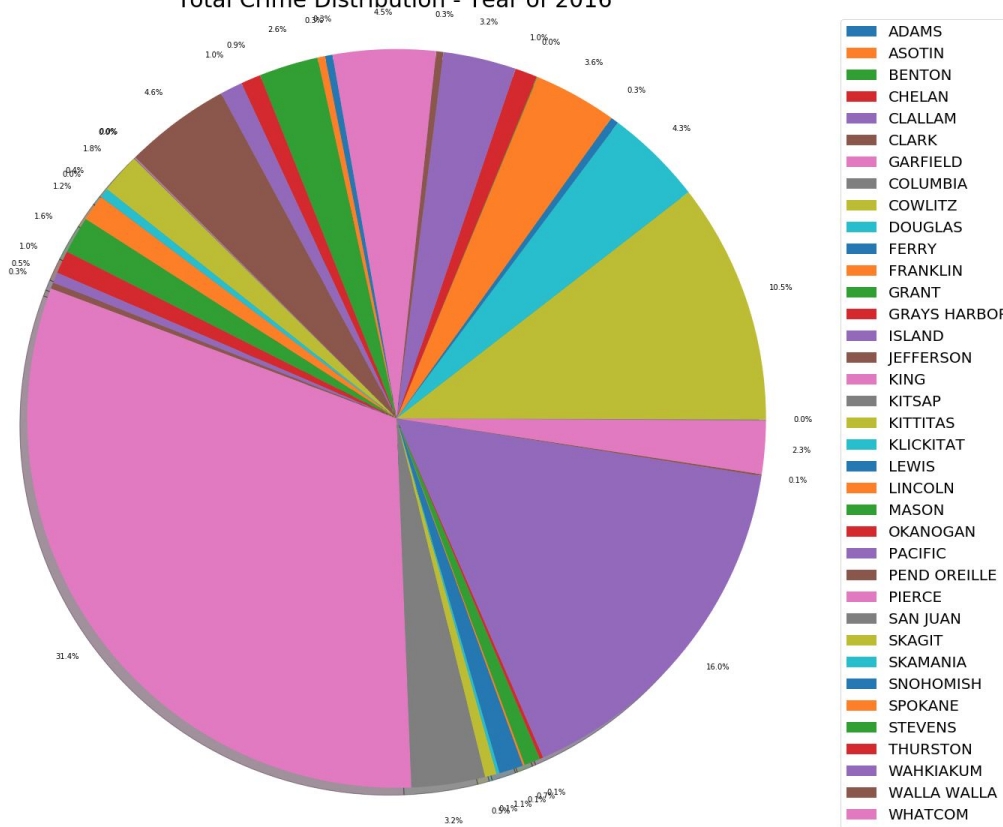
- 35 % of the state total crime happened in King County

- Adams County has the highest Crime % (Total Crime/ Total Population) of 10.94%

- 34.8% of the state total crime happened in King County

- Garfield County has the highest Crime % (Total Crime/ Total Population) of 9.34%

Total Crime Distribution - Year of 2016

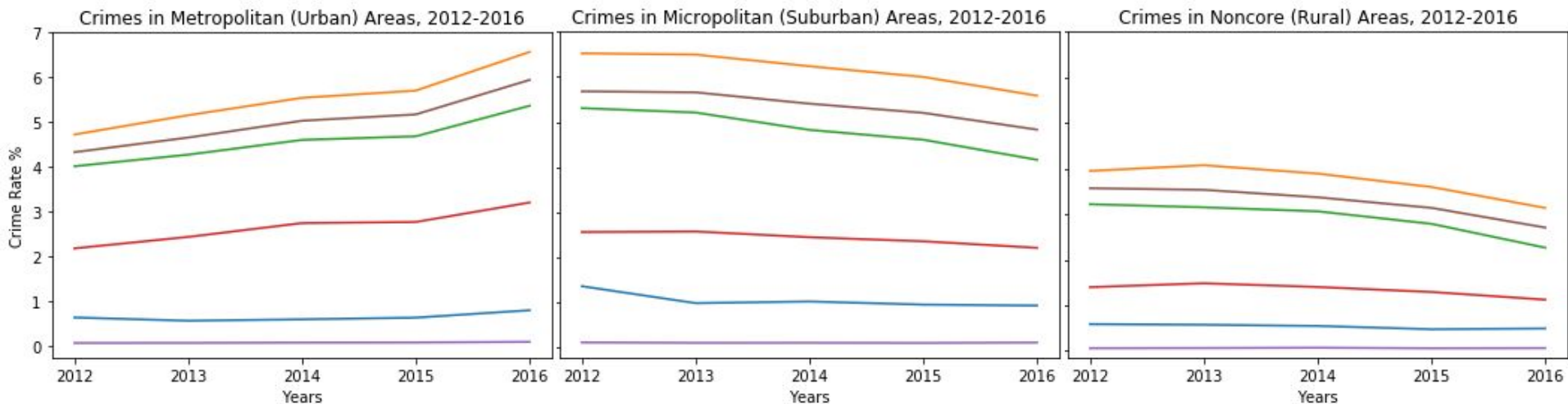


- 31.4 % of the state total crime happened in King County
- Skagit County has the highest Crime % (Total Crime/ Total Population) of 10.94%

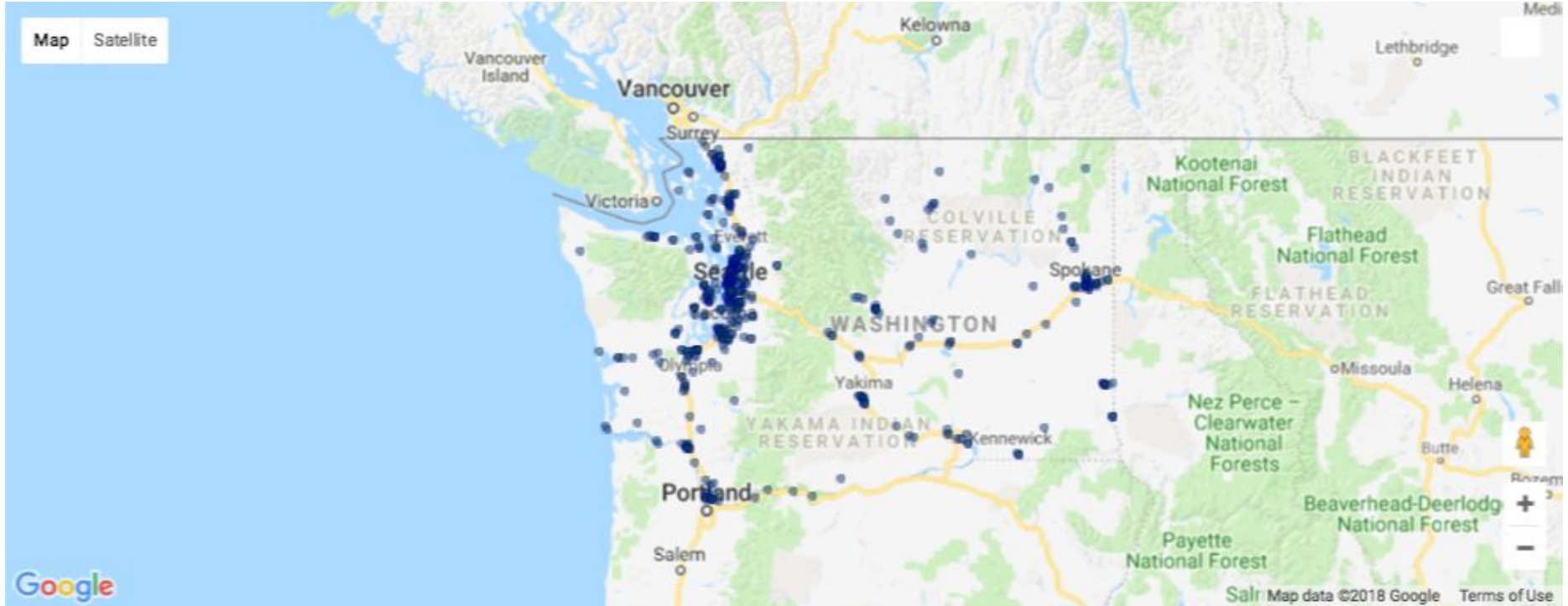


Crimes Segmented by County Type

- Rural areas had a lower crime rate %
- Crimes increased slightly in Metropolitan areas, decreased in Suburban and Rural areas
- All types of crime showed the same change

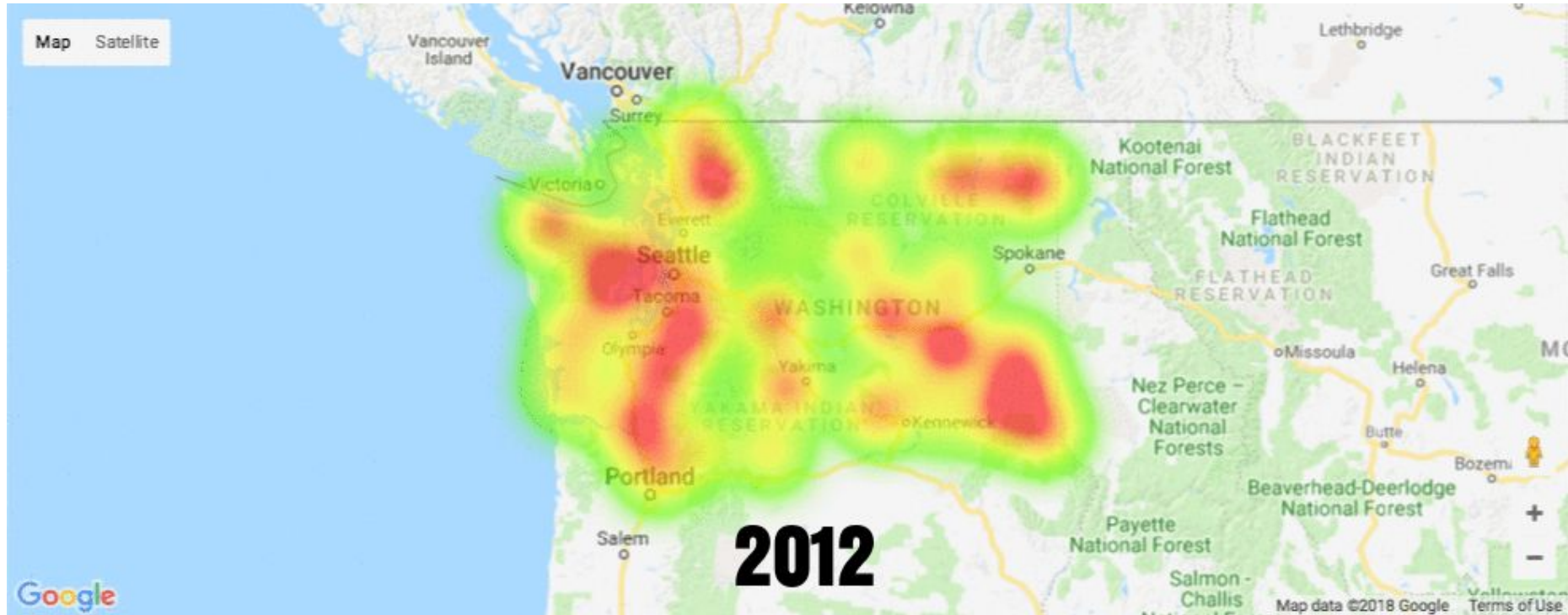


Map of Store Locations



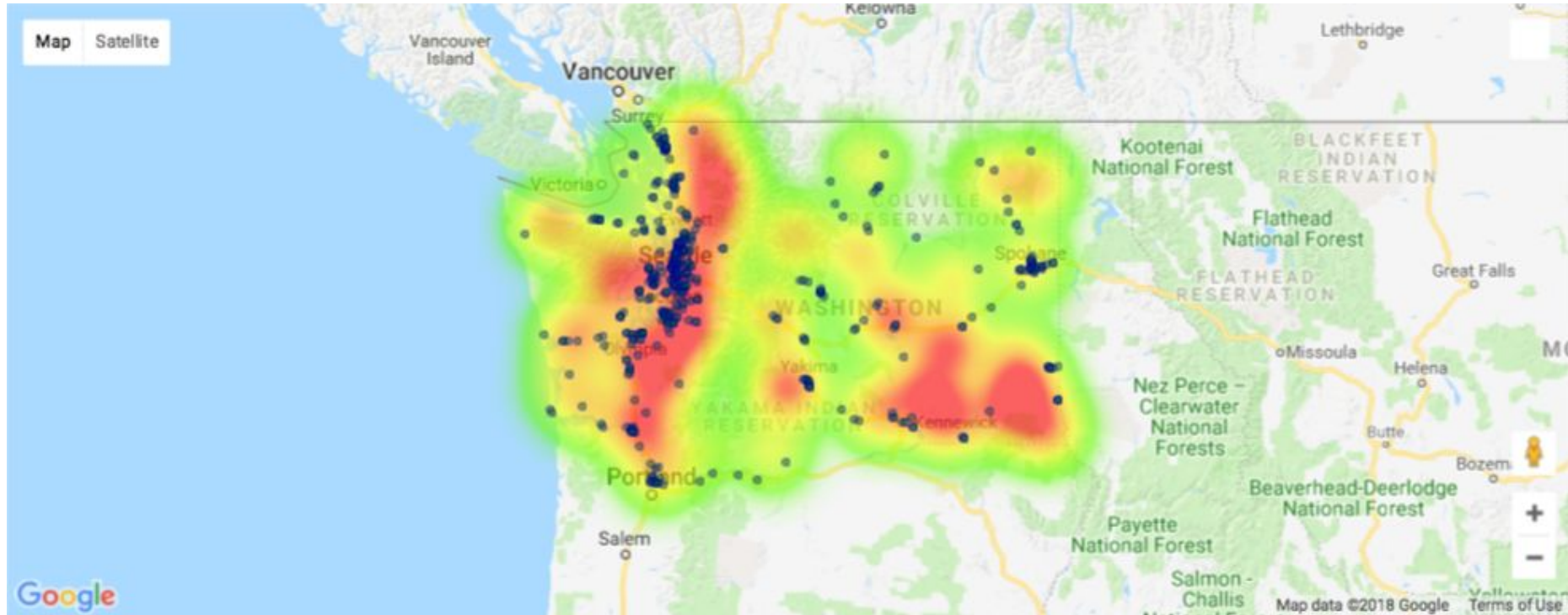
* Active (Issued) Licensed Stores

Heatmap of Crime Rate Percentage



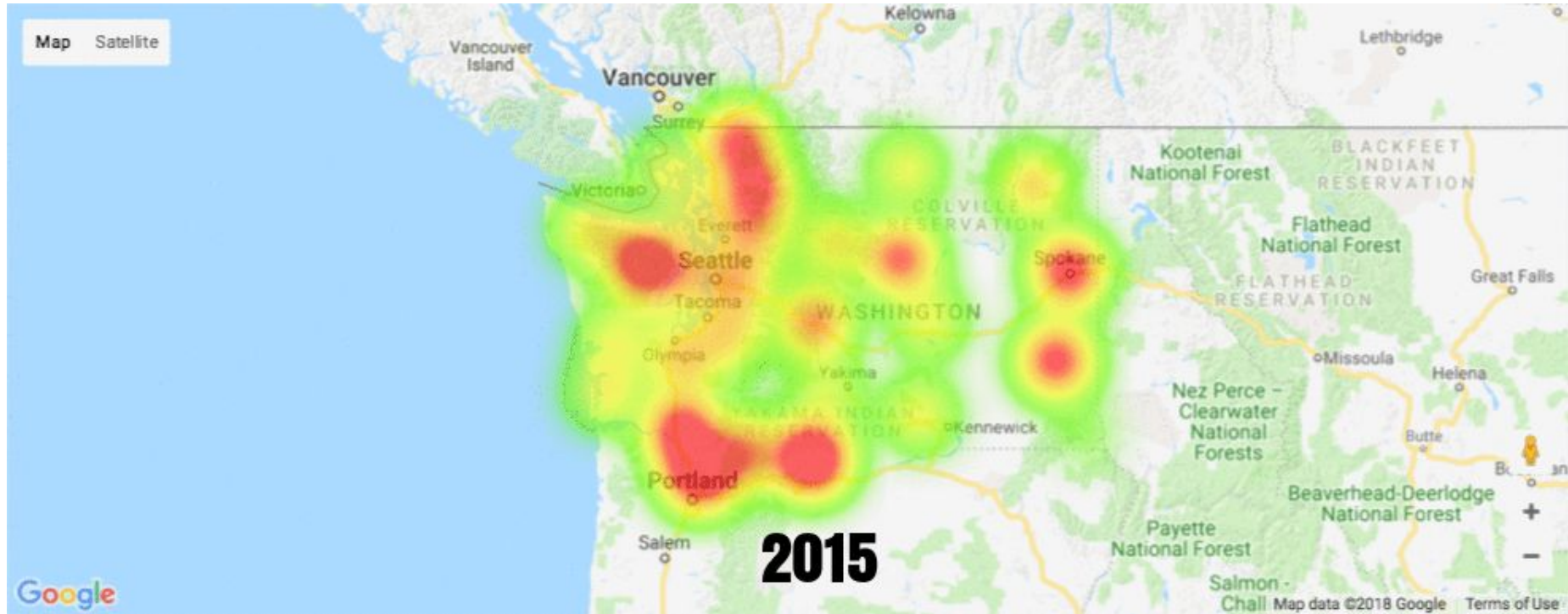
** Crime Rate Percentage over Population per County (2012-2016)*

Store Locations with Heatmap of Crime Rate



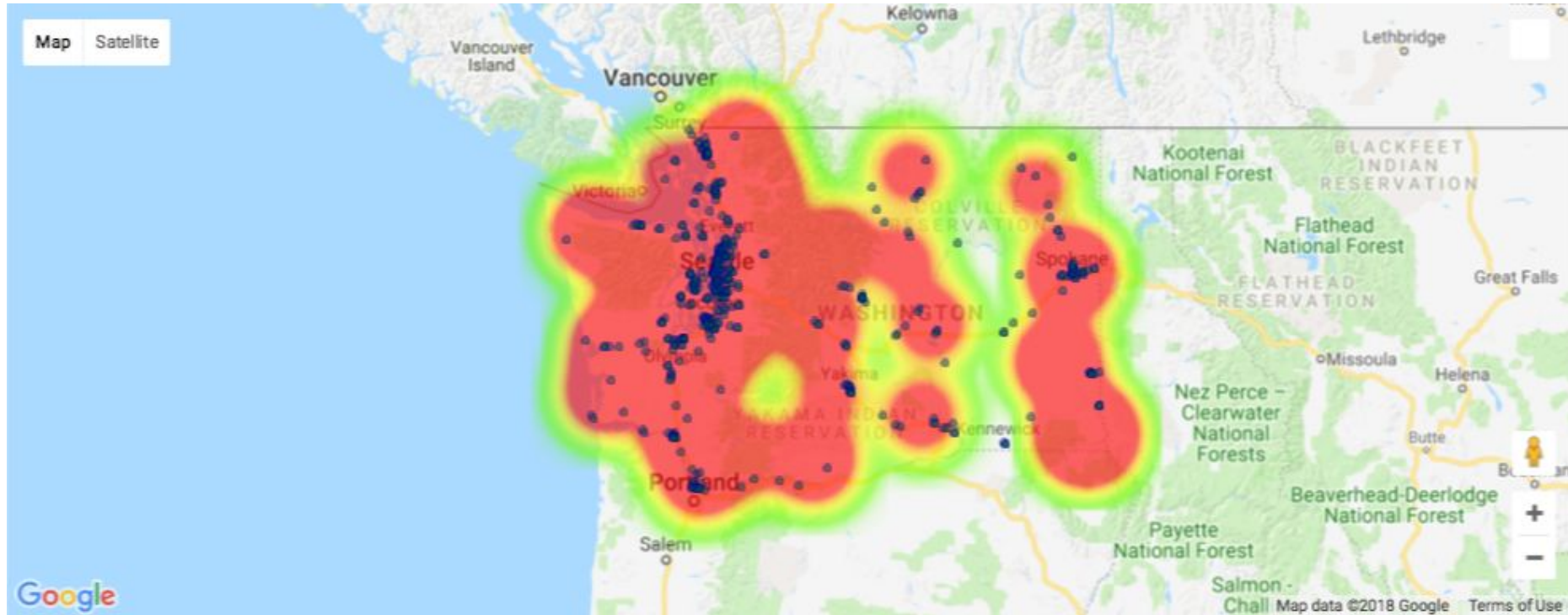
** Store Locations over Heatmap of Crime Rate for 2016*

Heatmap of Sales Percentages per Population



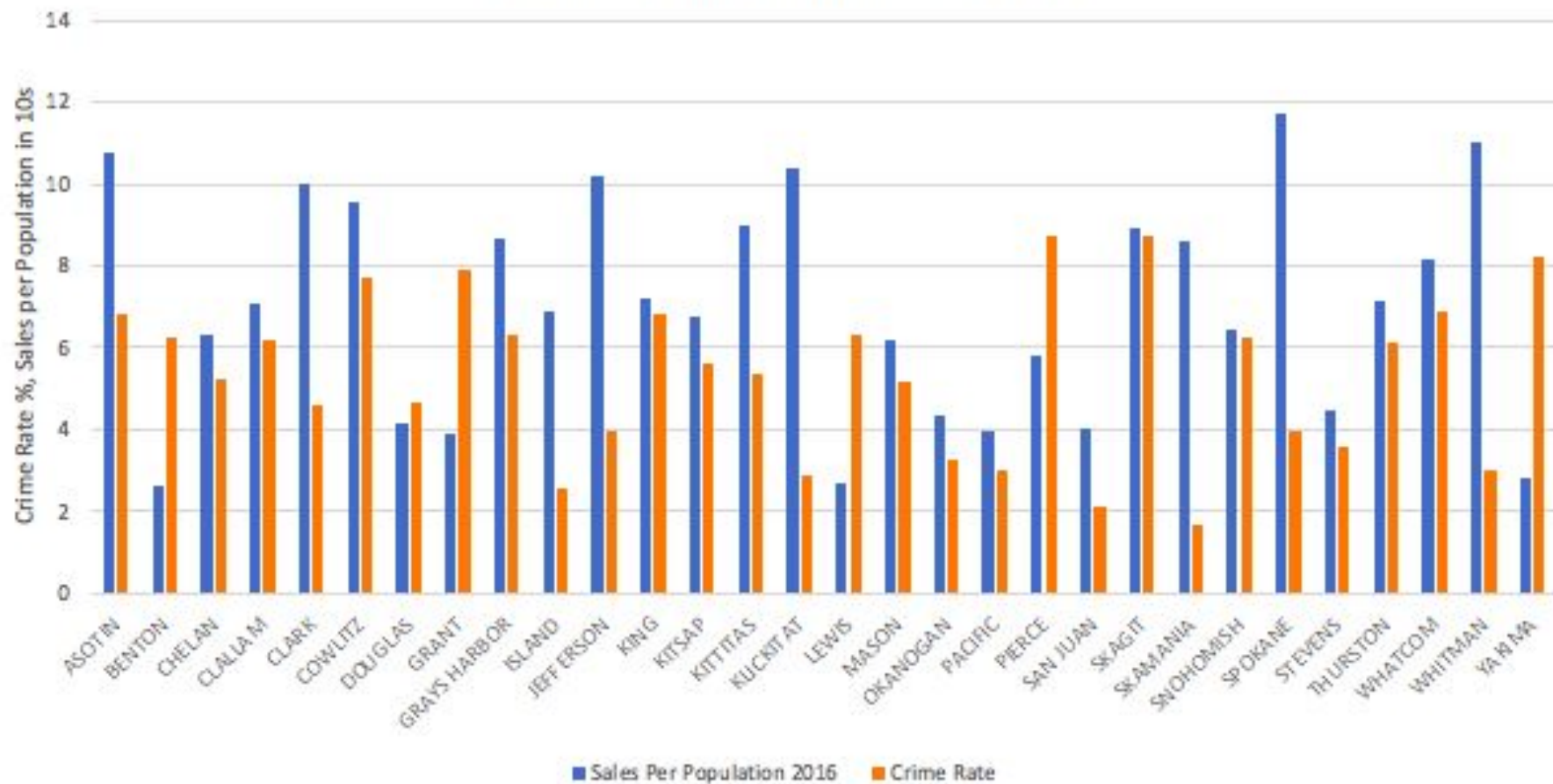
* Sales over Population per County (2015-2017)

Store Locations with Heatmap of Sales Percentages



** Store Locations with Heatmap of Sales over Populations for 2017*

Sales per Popolation and Crime Rate 2016



Observations

- As sales revenue increased, overall crime rate in the State of WA increased
- Crime rate of violence and murder, robbery, and property related crimes had an identical increasing trend as the overall crime rate.
- Counties which have higher crime rates are usually located closer to state border, and in areas of higher density of dispensaries

Independent T test

Alternative Hypothesis: If legalization of recreational marijuana affects crime rate, then there would be a significant difference in crime rate between before (2012-2014) and after legalization of recreational marijuana (2014-2016).

Null Hypothesis: If legalization of recreational marijuana doesn't affect crime rate, then there would be no significant difference in crime rate before and after legalization of recreational marijuana.

Assumptions:

- Data is normally distributed
- Data is independent
- Data is homogenous (The standard deviations are roughly equal)

Overall Crime

p-value: 0.117

Violence + Murder

p-value: 0.115

Since $p\text{-value} > 0.05$, we cannot reject the null hypothesis.

Note: Population has 3 data points, this T test is to demonstrate the purpose of a t test in our project.

Sources

- WA.gov
- FBI.gov
- Google API