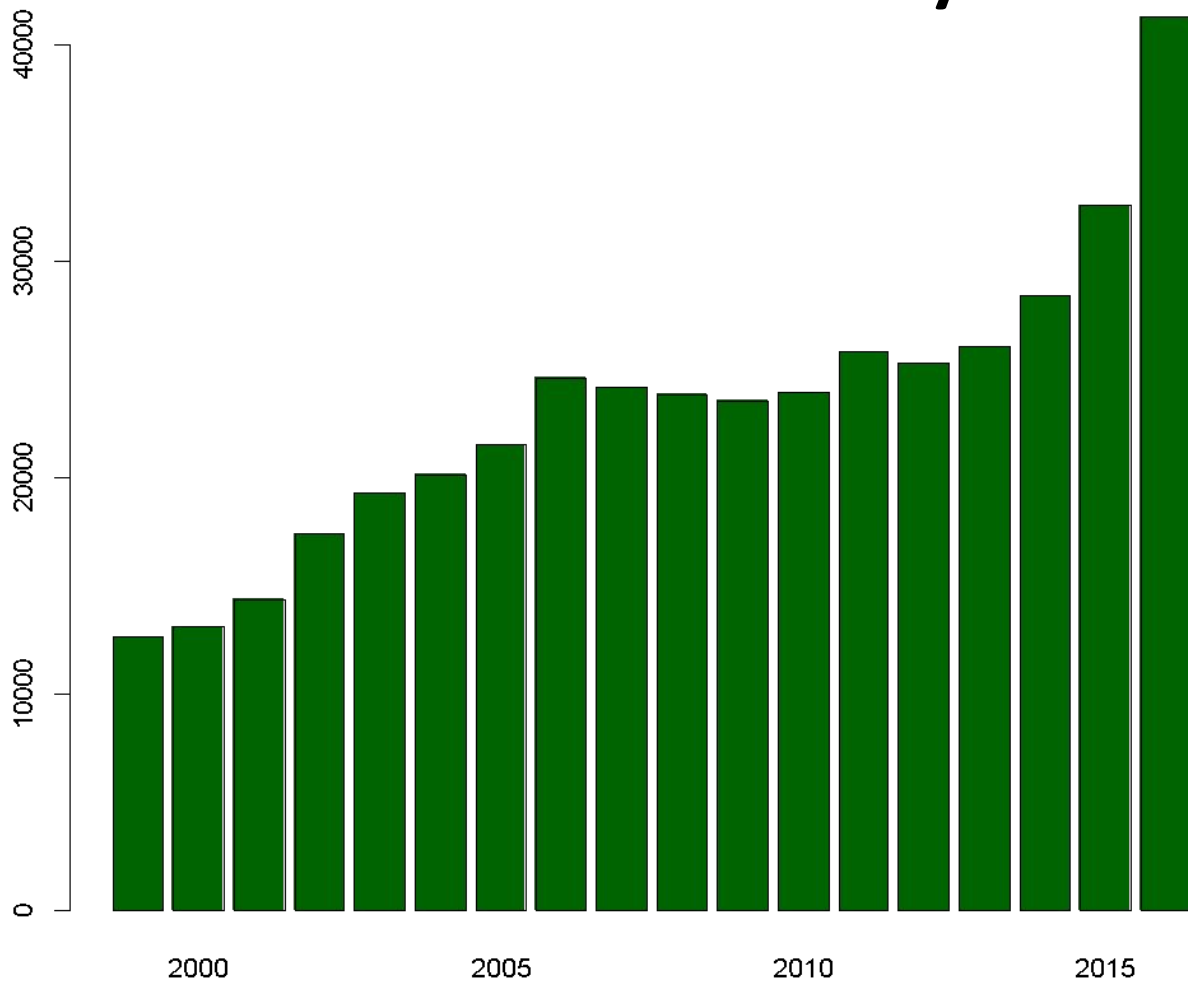# What Factors Affect Drug Overdose Death Rates?
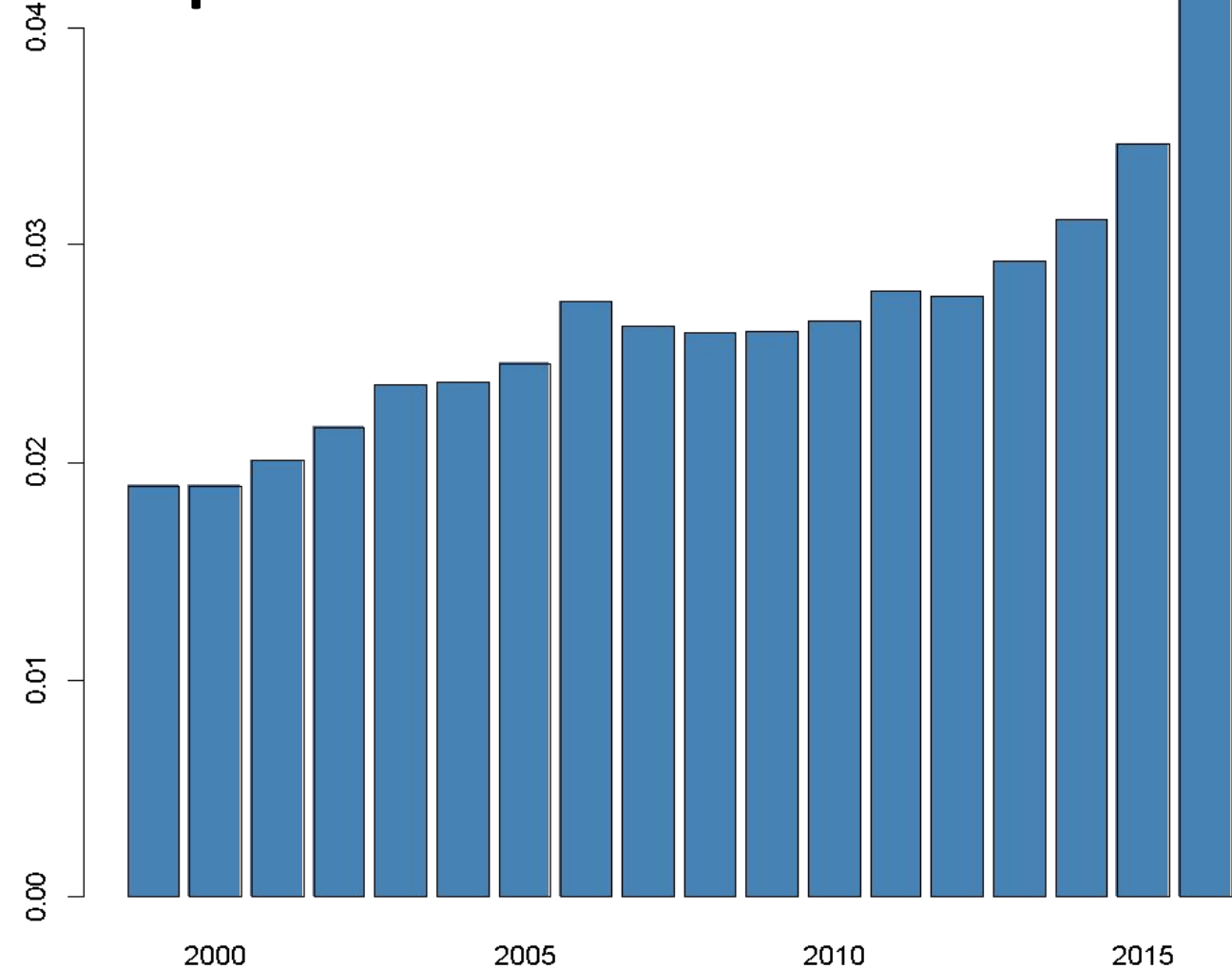
A look at race, gender, age, and region as useful predictors for drug overdose percentage rates in a given population
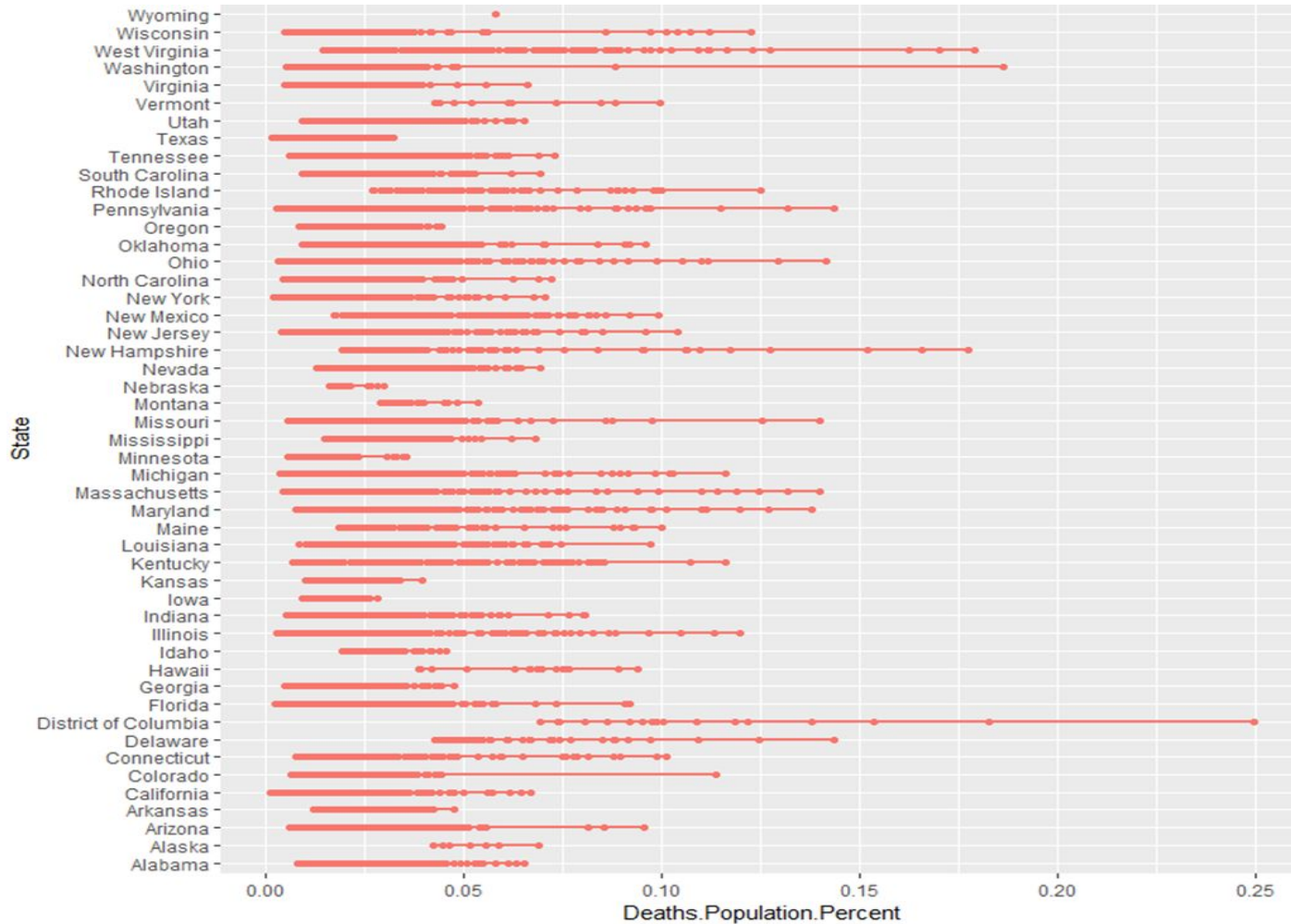
Why is this Important?

From 1999 to 2016, the number of drug overdose deaths in the U.S. went up approximately 300%.
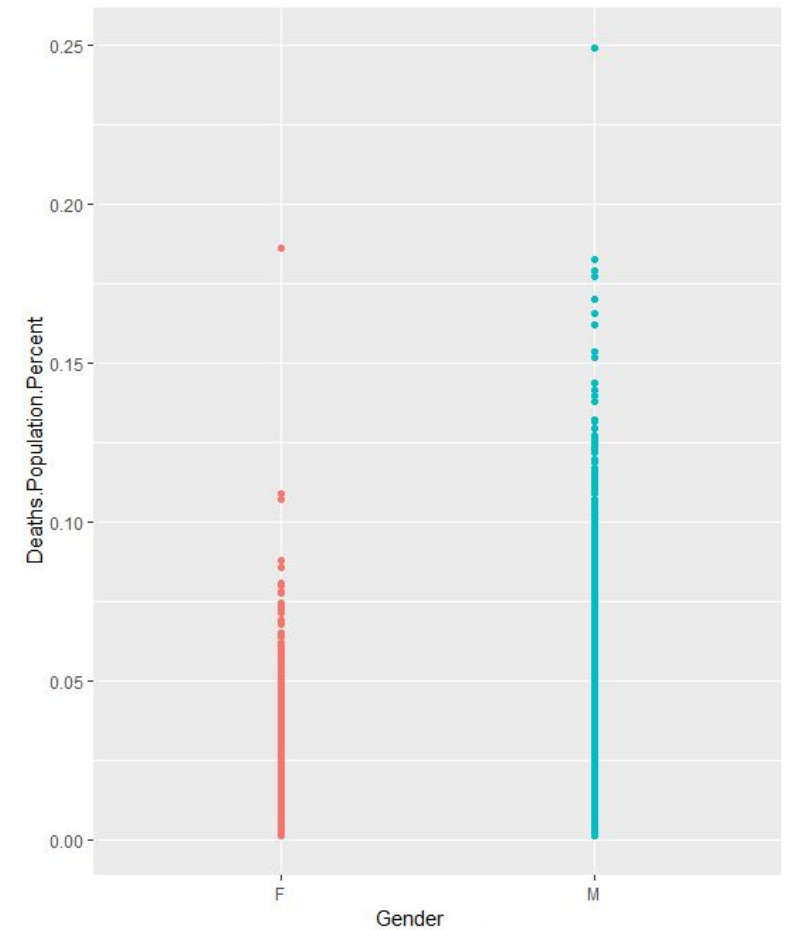
Even after accounting for population growth from year to year, the positive trend continues.
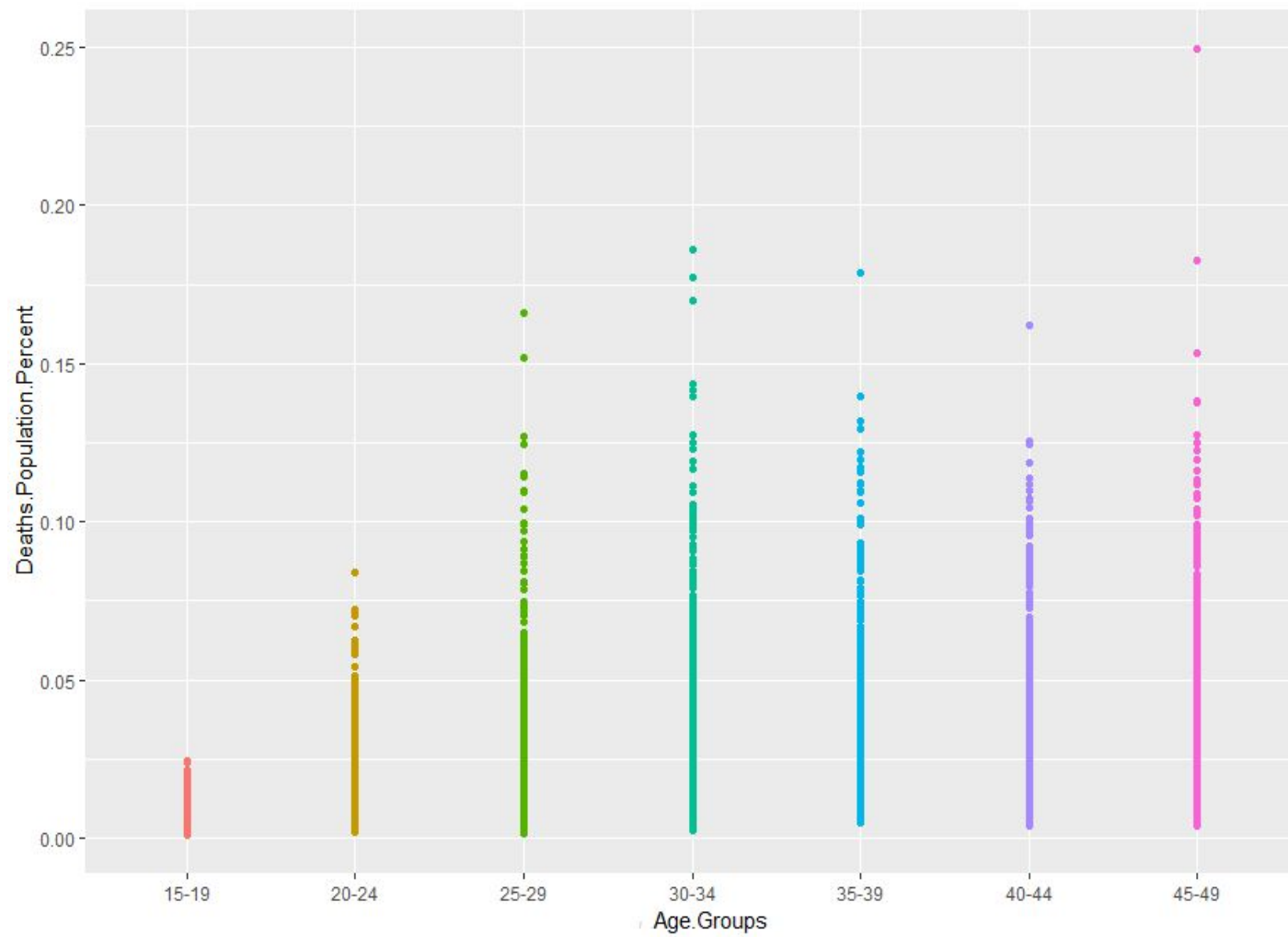
In order to combat these rising numbers, we have to answer an important question: Who is overdosing?

Which states have the highest overdose rates per population?

Which gender has higher overdose rates?

- Due to general trends or lack of data collection, death percentages by population do not approach the mean percentage of overdoses by population until the 25-29 years old age group.

Slimming the Dataset

- Due to suppressed values, missing values, and other data concerns, the data set analyzed was modified.

- The regions include, "Northeast", "South", "Midwest", and "West."

- 5-year Age Groups run from 25-54 years old.

- Races include "Caucasian," "Black or African American," "Asian or Pacific Islander," and "Native American," or "Alaska Native."

- Gender represents "Male" and "Female."

- The time frame for this data is from 2010-2016.
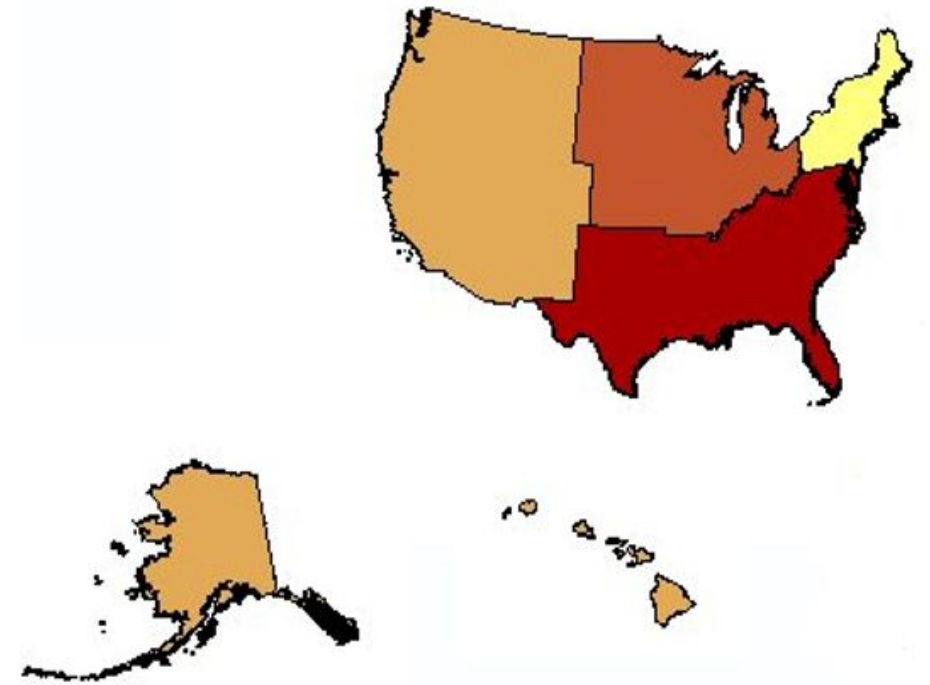
A map of regions discussed

Creating the Model

- A forward stepwise selection was used to create the model:

- $\gamma = b_0 + \beta_1 Gender + \beta_2 * AgeGroups + \beta_3 Region + \beta_4 Race + \beta_5 Gender * Region + \beta_6 Gender * Race + \beta_7 Race * AgeGroups + \beta_8 Race * Region + \varepsilon$

- Gender, the 5-Year Age Groups, Region, and Race all have significant effects on the mean value of γ, the percentage of deaths by population.

- Gender has a significant interaction with Region and Race. Race additionally has significant interactions with the Age Groups and Region in terms of their effect on the mean value of the percentage of deaths by population.

# Graphically Representing Interaction Terms
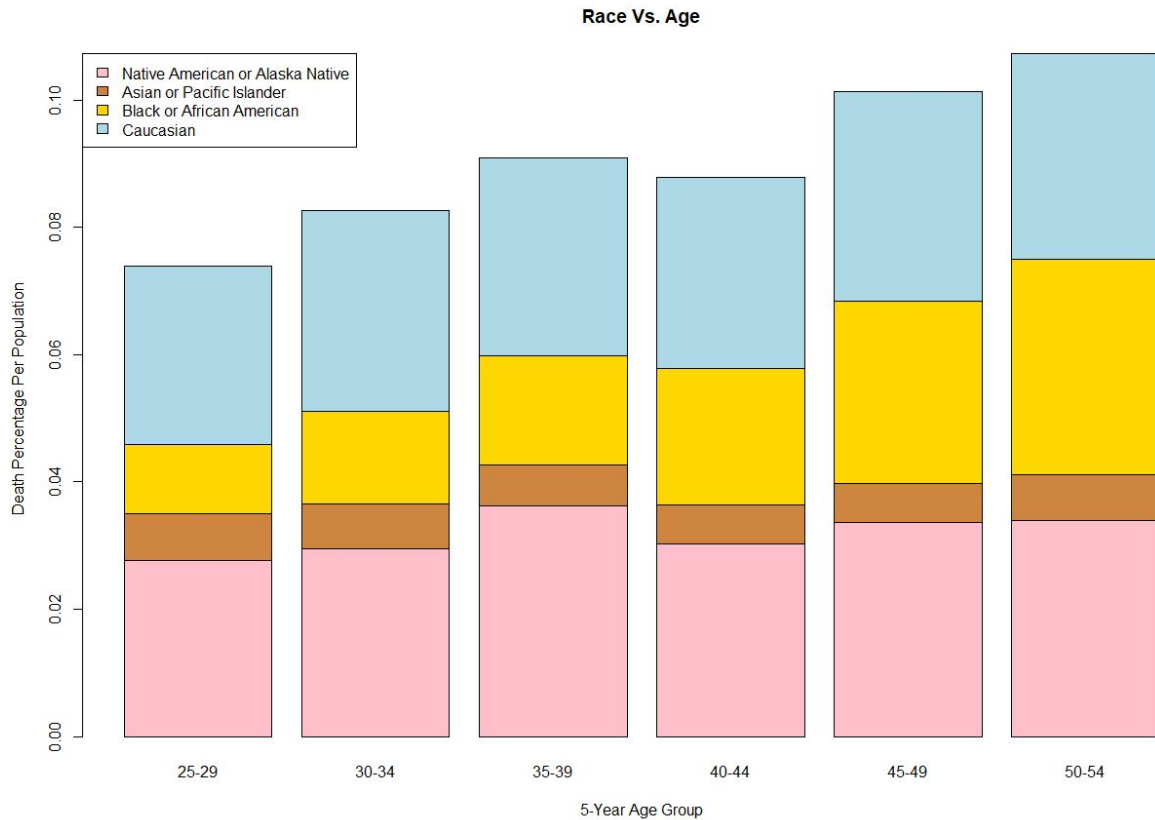
We see that Caucasians overdose at a higher rate.
Interestingly, when sorted by age group,
Native Americans are more affected by overdoses.
The same goes for older African Americans.
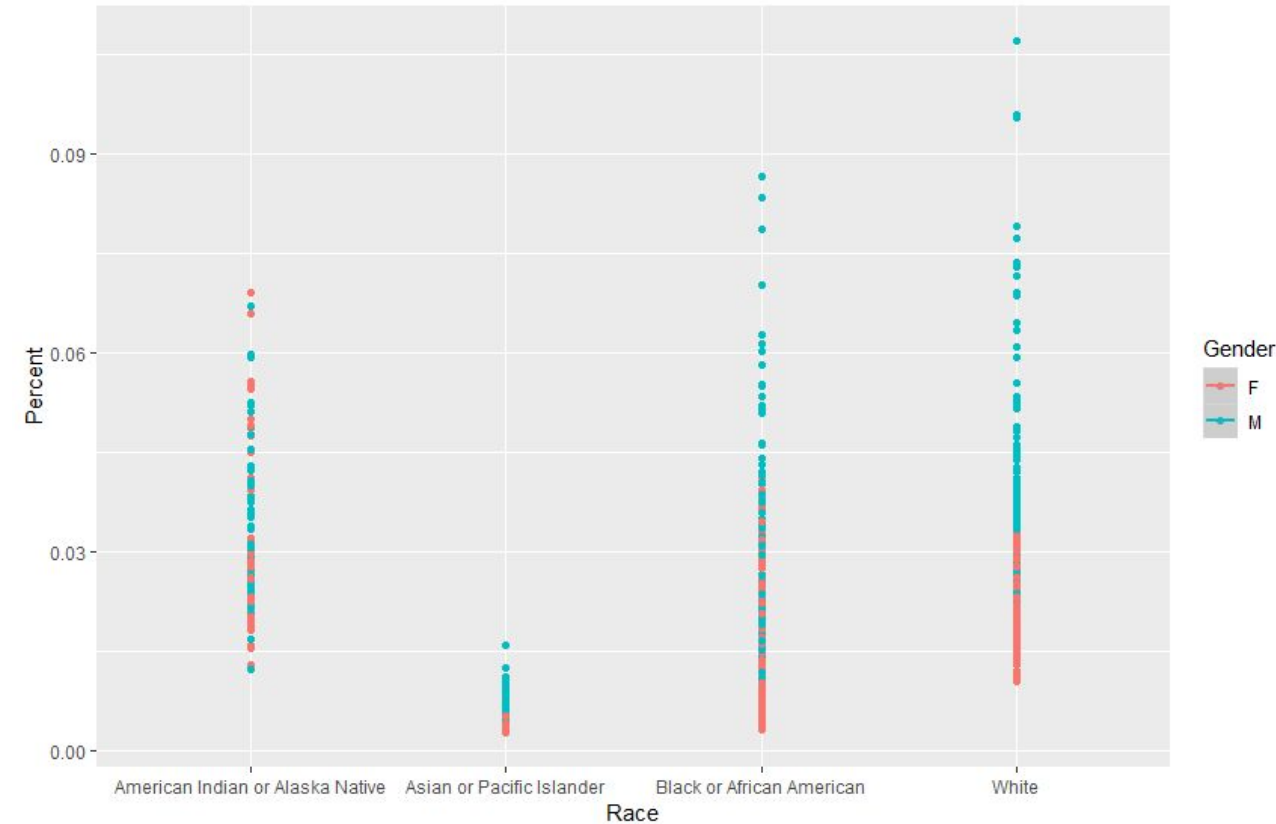
Although certain Native American/Alaska Native
female populations have higher overdose rates,
the problem persists mainly with white and black men.

Continuing to look at Interaction Terms

**Region Vs. Race**

Region Vs. Gender
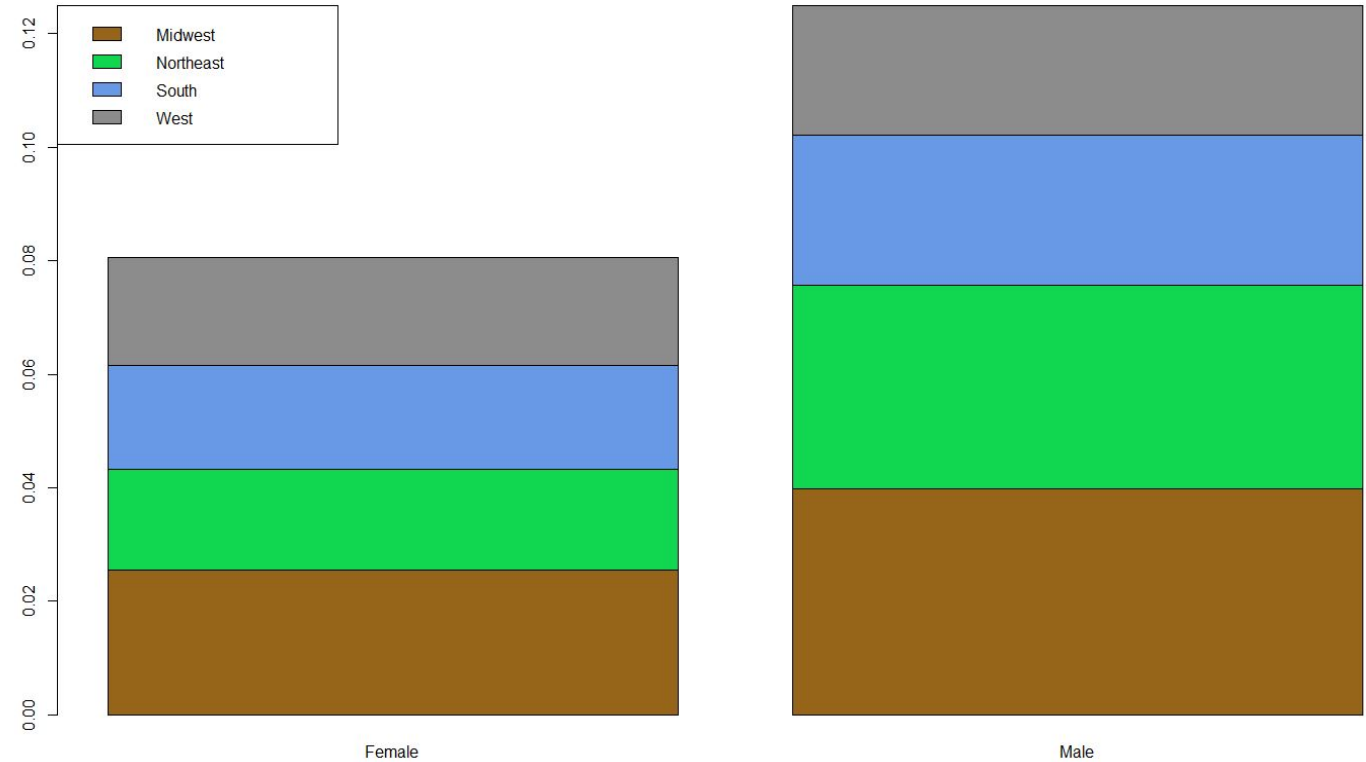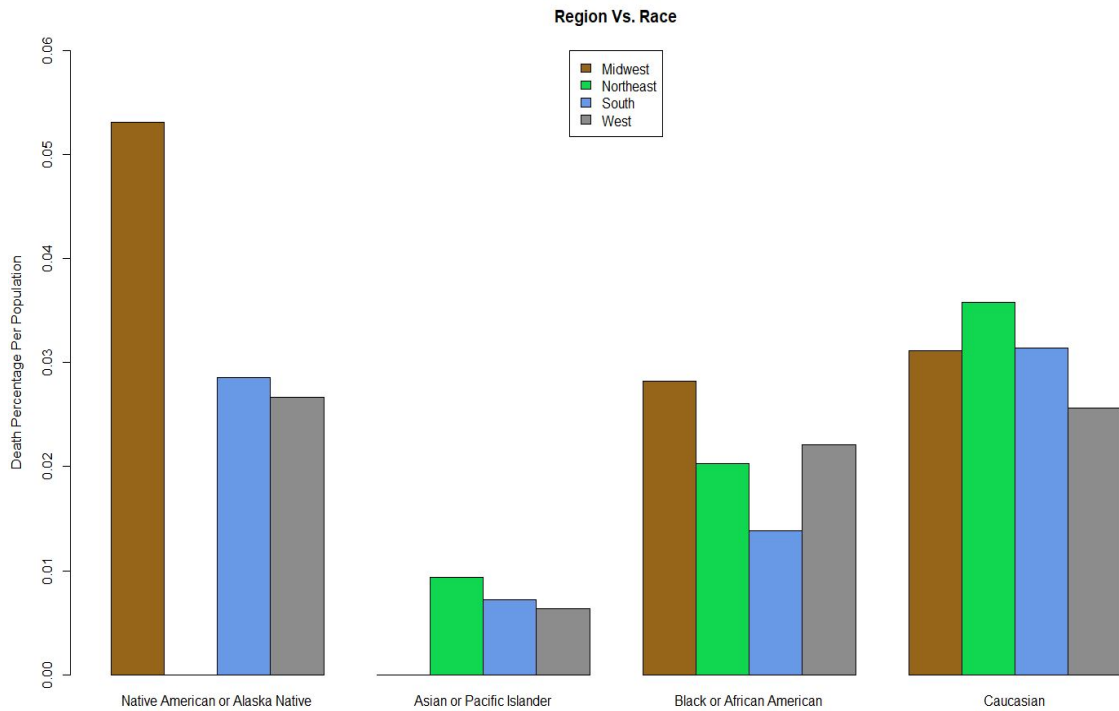
Drug overdoses impact Caucasians the most.
Native Americans/Alaska Natives in the Midwest have
a high rate of overdose as well.

There is evidence that those overdosing tends to be male,
particularly those from the Midwest or Northeast.

How do we fix the problem?

- In order to combat the growing overdose problem, the main victim groups must be targeted for rehabilitation and treatment to prevent overdoses.

- Caucasians and subgroups of Native Americans previously discussed, particularly from the Midwest, have higher chances of overdose. Interacting with and helping these groups could be key to solving the overdose epidemic.

- The Midwest is particularly affected, and this is why it could serve as a good center of operations to combat the overdose crisis.
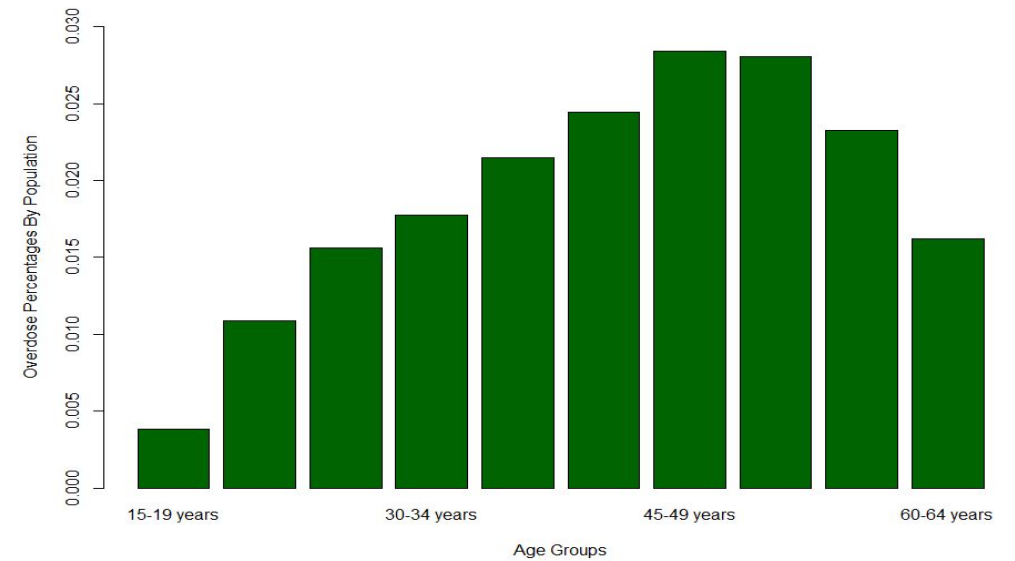
Outreach and education programs targeting younger Americans could prove beneficial.
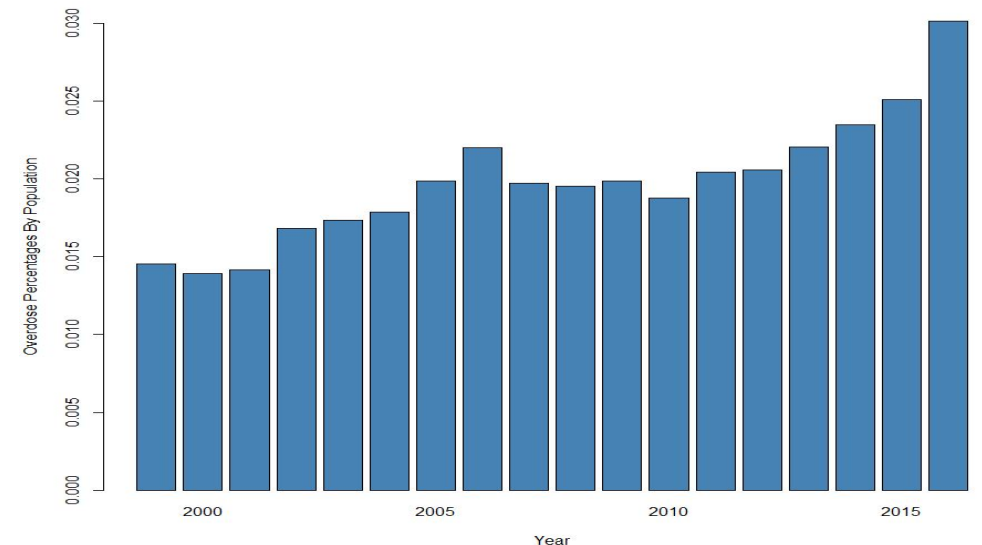
The problem will not solve itself and will continue to worsen.

Conclusion

- There are obvious factors that can be used to predict the likelihood of a person dying from a drug overdose. Middle aged men from the Midwest, especially those of Caucasian and Native American descent, seem to be the ones to focus on reaching out to – whether through clean needle exchange programs or increased rehabilitation programs .

- It is important to note that these factors do not exist in a vacuum. As shown in our model and graphical visualizations, we showed that many of the predictors for overdose percentages affected each other. A 35-39 year old man is more likely to overdose in the Midwest or Northeast than other locations of the country.

- The best solution would recognize this. It is not feasible to target the entirety of the white population in America. Narrowing the investigative scope and recognizing that a white man, Midwesterner, or middle-age person has a higher chance of overdose could help to focus efforts to prevent more overdose deaths.