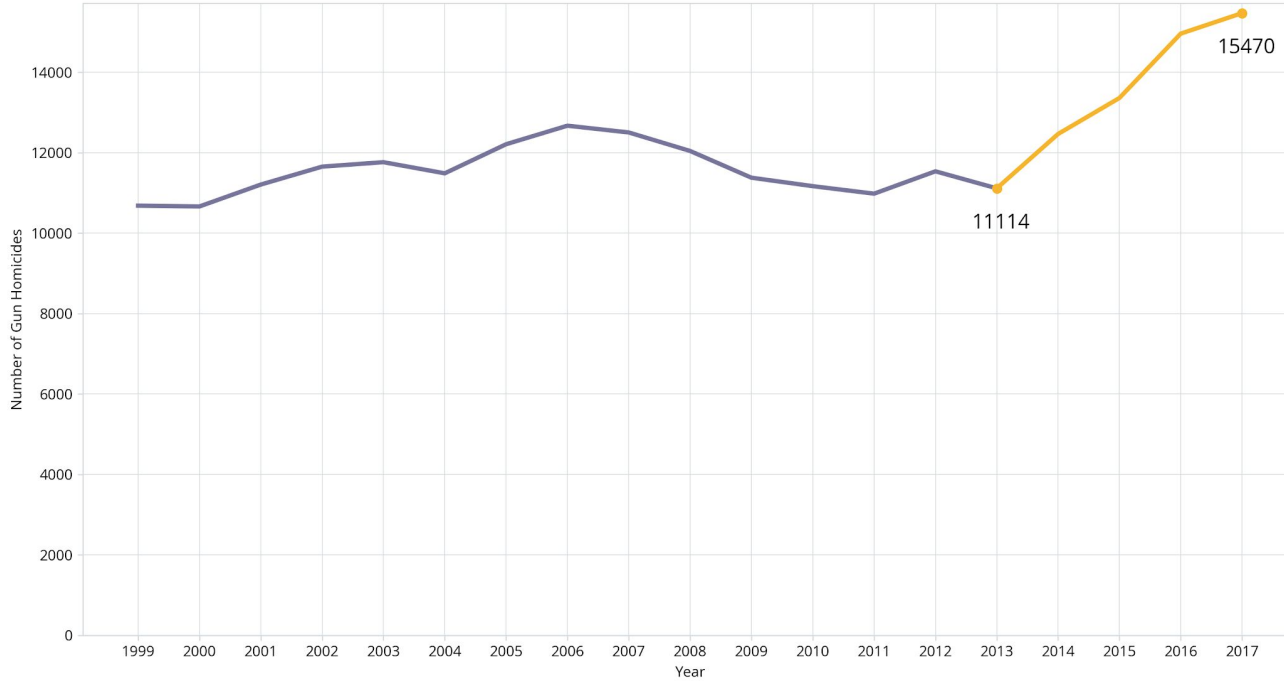# Gun Violence in the United States

Jonathan Shuai
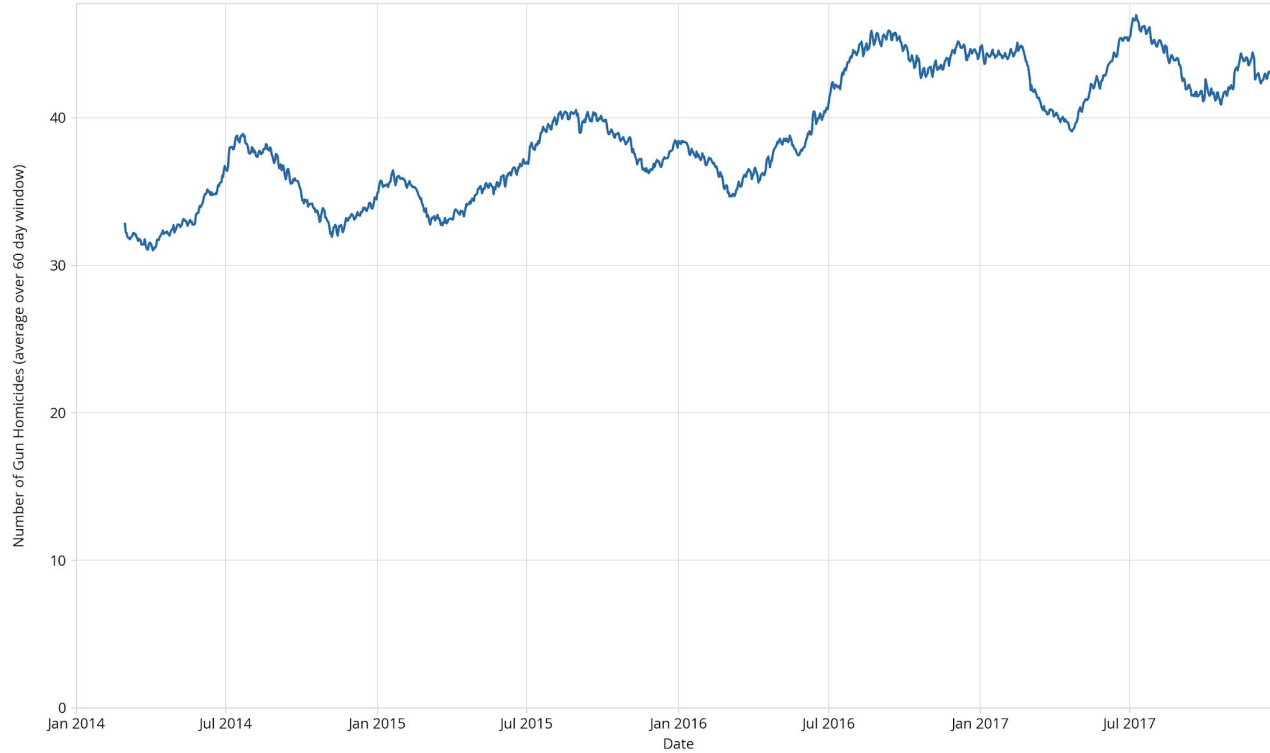
US Annual Gun Homicides (1999-2017)

The number of annual gun homicides in the United States has **increased by 39.1% in the last 4 years**.

US Daily Gun Homicides (2014-2017)

Gun violence **spikes during summers** and **at the start of each new year**.

Which states have the highest gun homicide rates*?

US Gun Homicide Rates (2017)

In 2017, **Hawaii had the lowest gun homicide rate at 0.57** homicides per 100,000 people. On the other hand, **Louisiana had the highest at 11.72**.
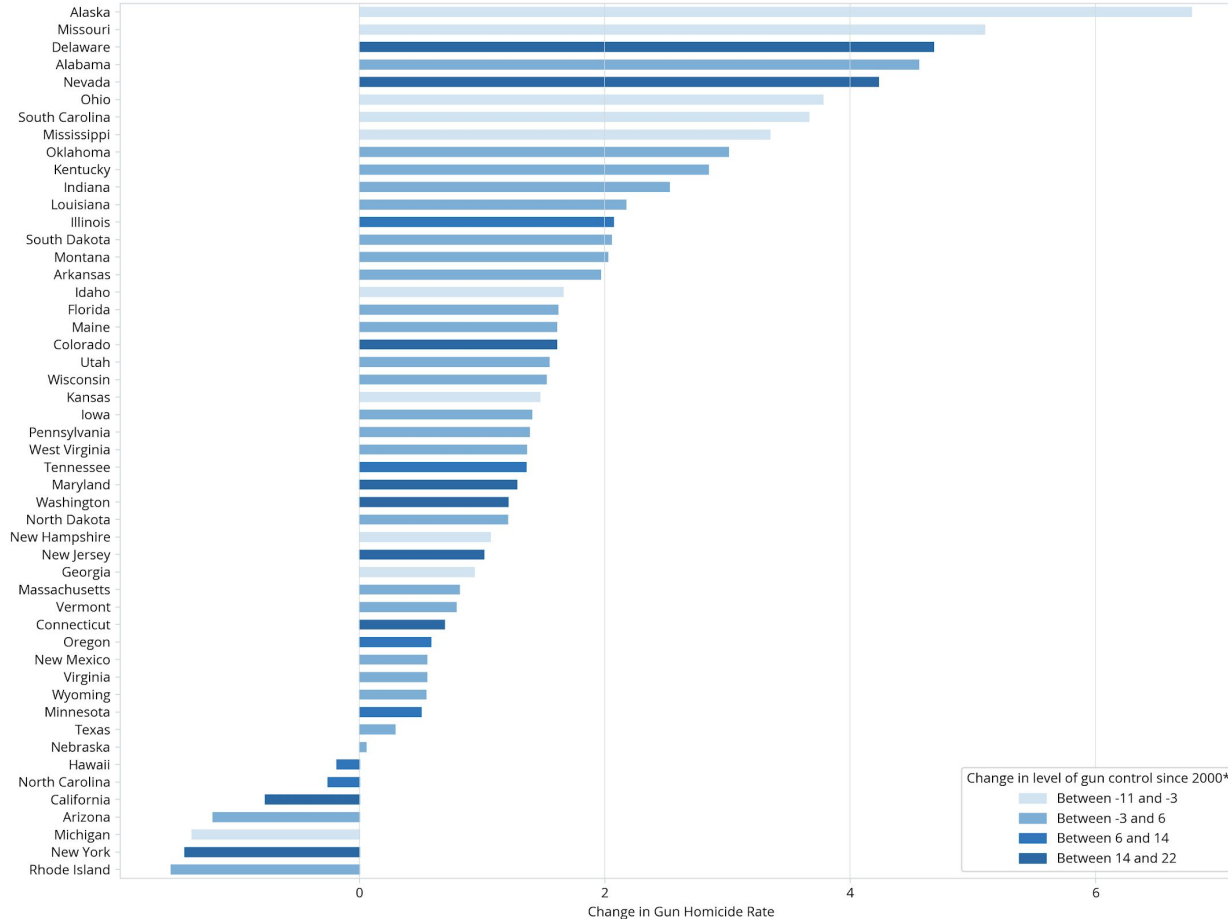
Hawaii has historically been the state with the lowest gun violence rates.
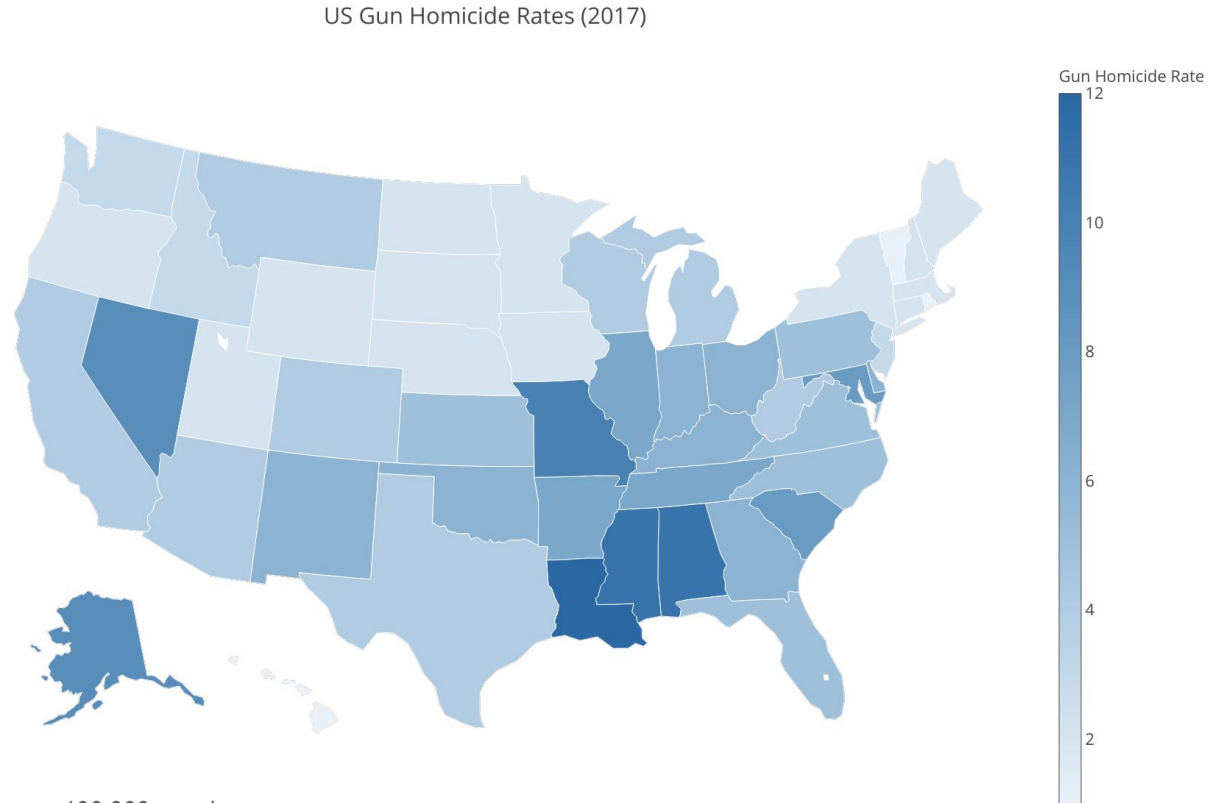
Gun Homicide Rate

Gun homicide rate is defined as number of homicides per 100,000 people

How has gun control contributed
to gun violence prevention?

Gun Homicide Rate Changes Between 2000 and 2017

Only **7 states have seen a decrease in gun violence** from 2000 to 2017.

In general, states that have had **larger increases in gun control provisions** have also had **lower increases in gun homicide**.

Gun control level is defined as total number of gun control provisions in place.

States with the largest decreases in gun violence rates since 2000
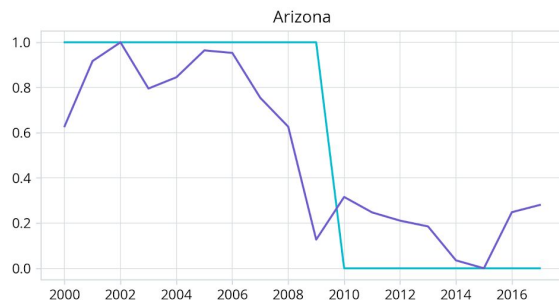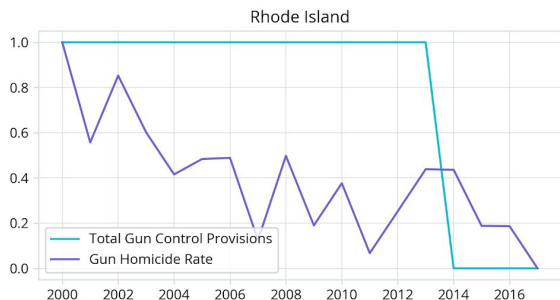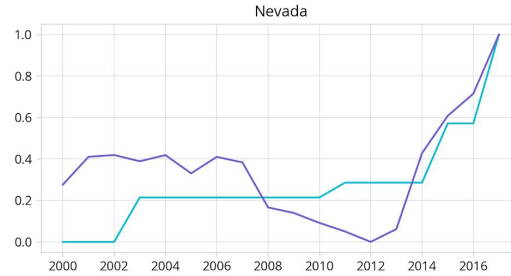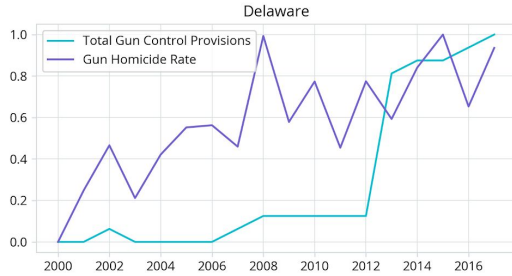

In Rhode Island and Arizona, **gun control laws become more lenient when gun violence trends are already decreasing**.
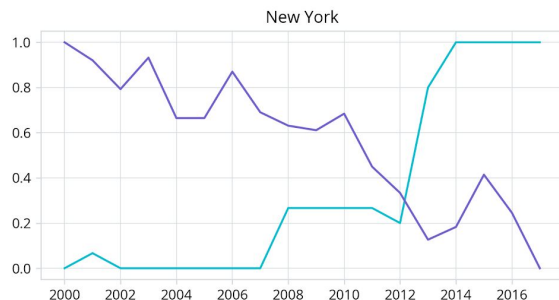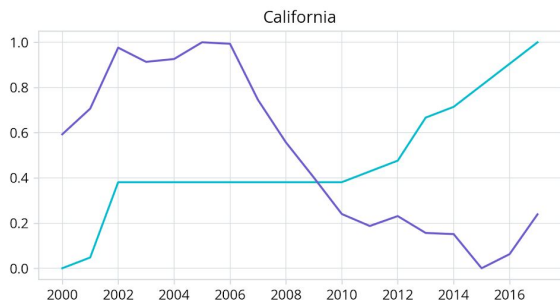
In California and New York, **as gun control become more strict, gun violence rates go down**.
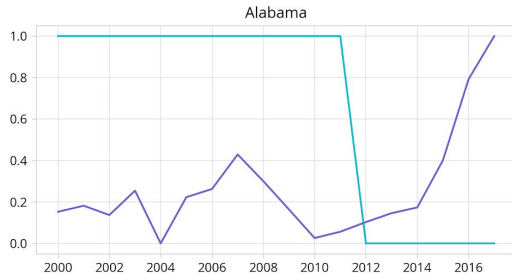
States with the largest increases in gun violence rates since 2000

In Delaware and Nevada, **gun control provisions increase in reaction to increases in gun violence trends** (likely as a measure to reduce gun violence).
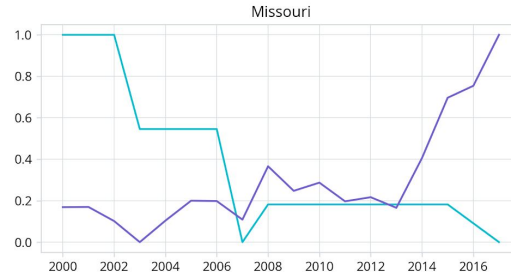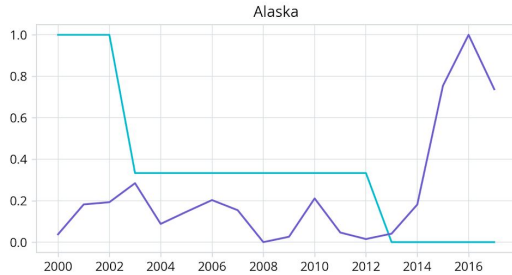
In Alaska, Missouri, and Alabama, **decreases in gun control provisions are followed by steep increases in gun violence.**

Removal of the 'No Stand Your Ground' Provision
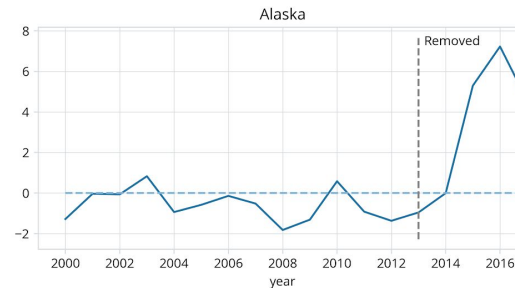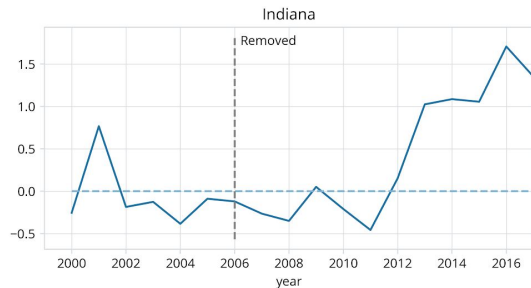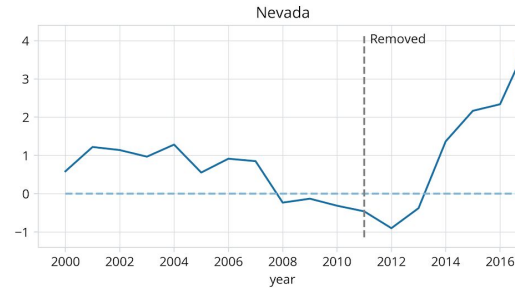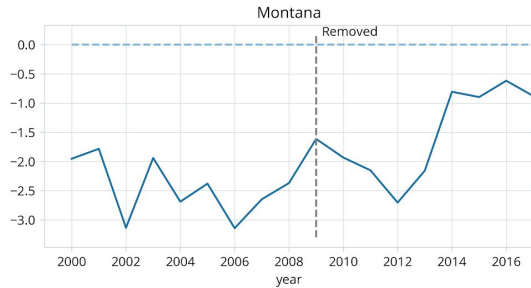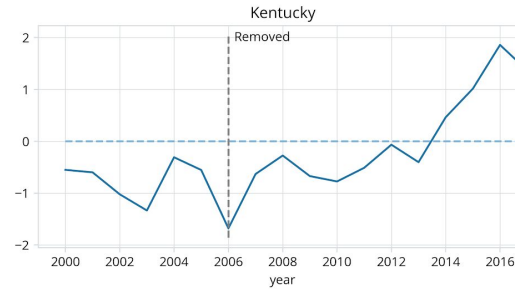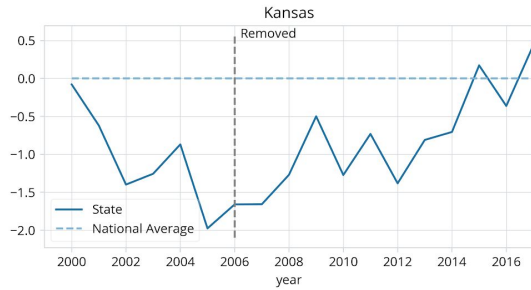
The **removal of the 'no stand your ground' provision** was correlated with the **highest increases in gun violence** compared to any other provision.

The 'no stand your ground' provision says that **use of deadly force may not be used as a first resort in public**.

Although this provision is not directly related to gun regulation, it seems to say something about the attitude towards gun usage in the states that remove this provision.

Effect of Provision Categories On Gun Violence (2017)
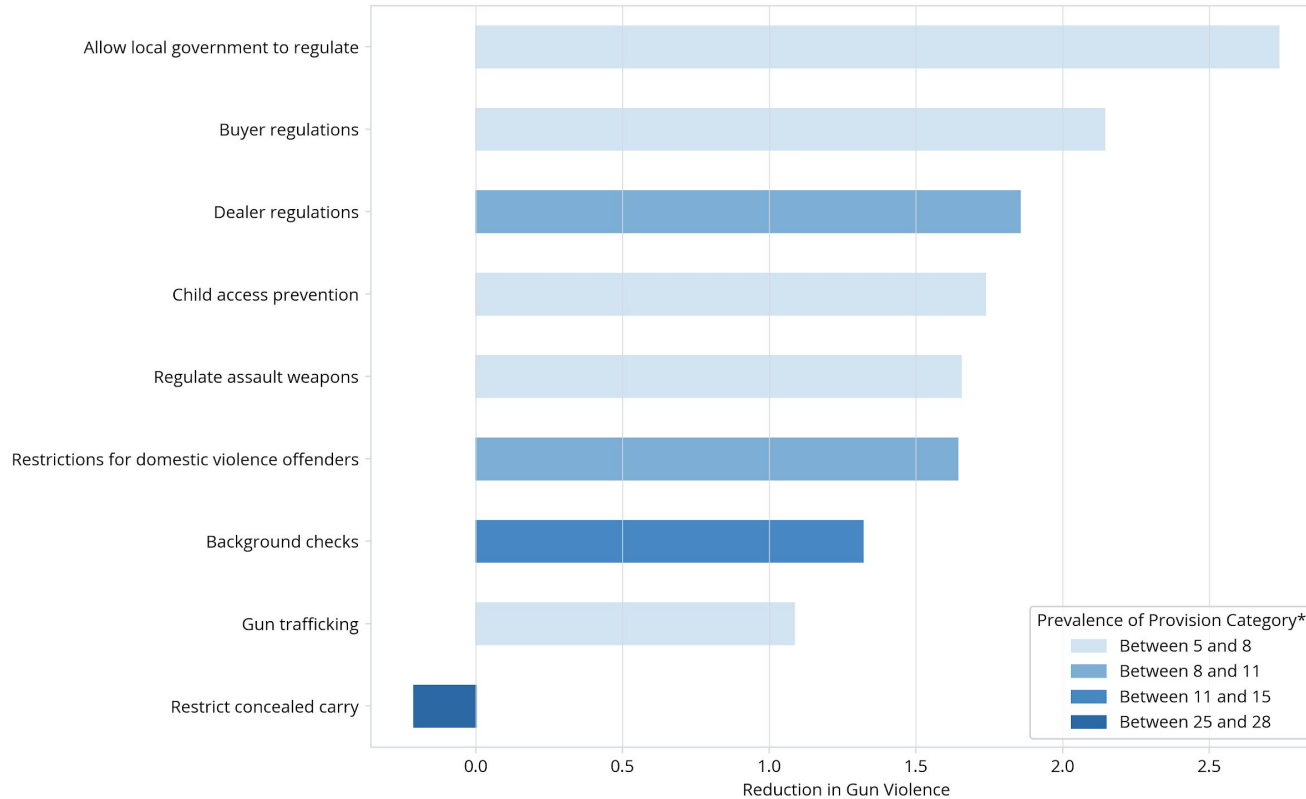
Gun control laws that **place regulations on buyers** and **allow local governments to regulate firearms** are most highly correlated with lower gun violence rates.

Laws restricting concealed carry have correlation with **slightly higher gun violence rates**. Though many states have laws concealed carry, the data shows it might not be very effective.

Bar chart with categories (top to bottom): Allow local government to regulate, Buyer regulations, Dealer regulations, Child access prevention, Regulate assault weapons, Restrictions for domestic violence offenders, Background checks, Gun trafficking, Restrict concealed carry.

X-axis: Reduction in Gun Violence (0.0 to 2.5)

Legend — Prevalence of Provision Category*:
- Between 5 and 8
- Between 8 and 11
- Between 11 and 15
- Between 25 and 28

Prevalence of a category is defined as the number of states that implement each provision in the category, on average.

Are there other features correlated with gun violence?
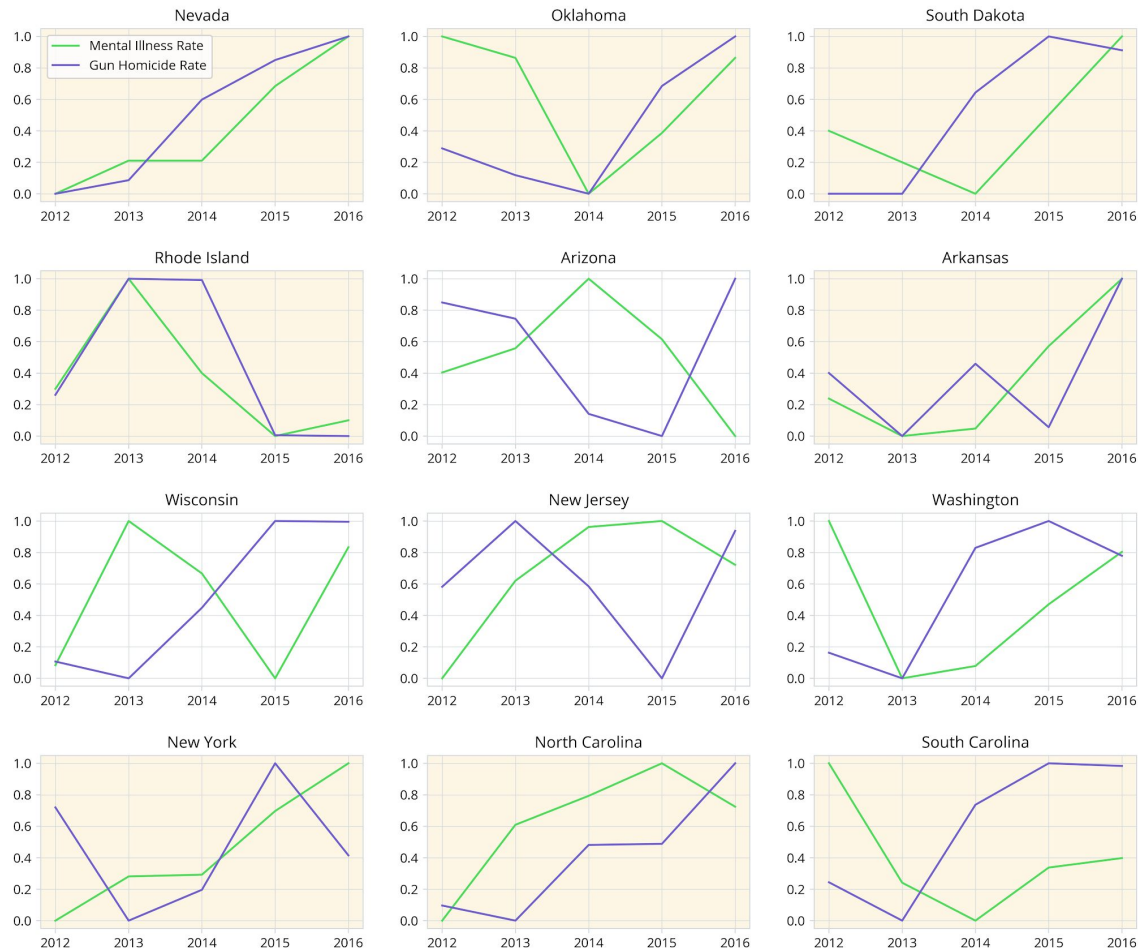
Weapons Registered and Gun Homicide Rate Trends (2013-2017)
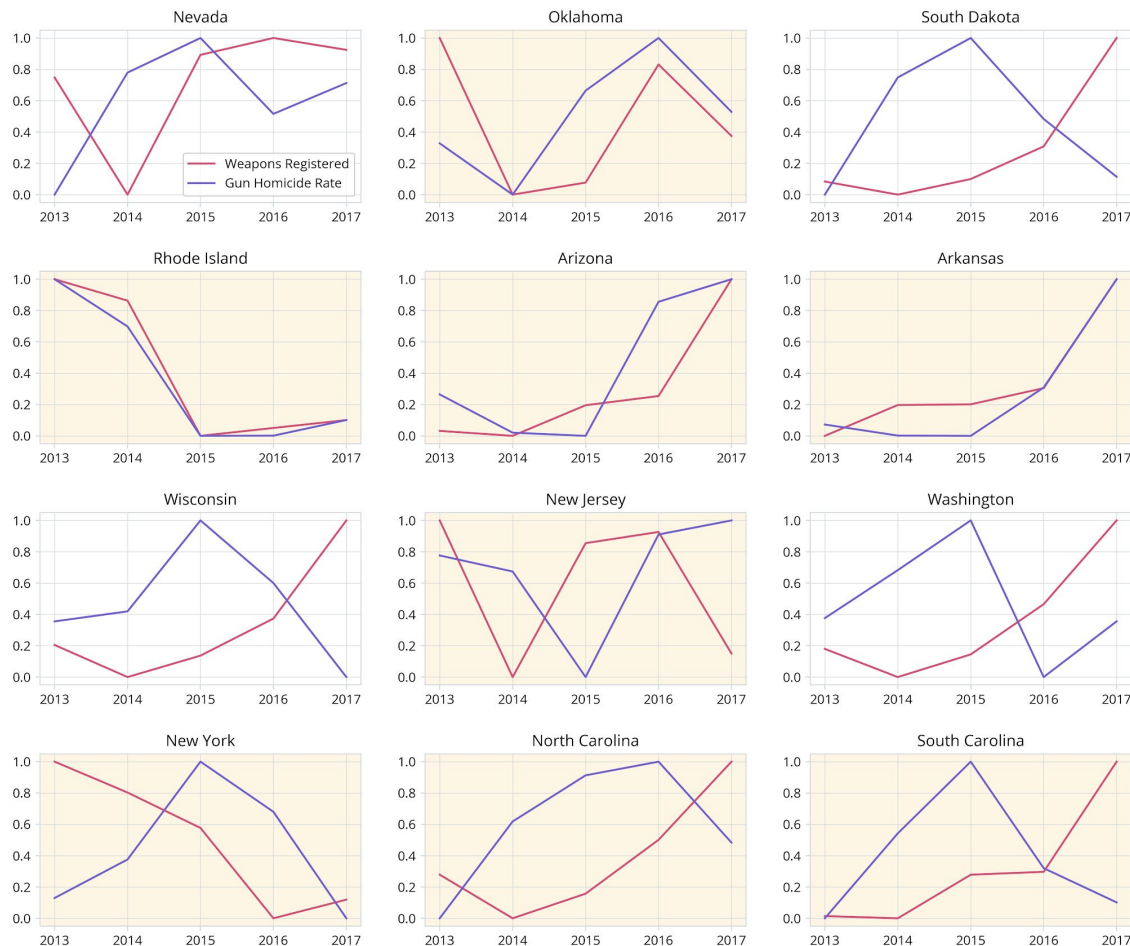
We can see that **gun violence trends follow the number of weapons registered**, especially in the **highlighted states**.
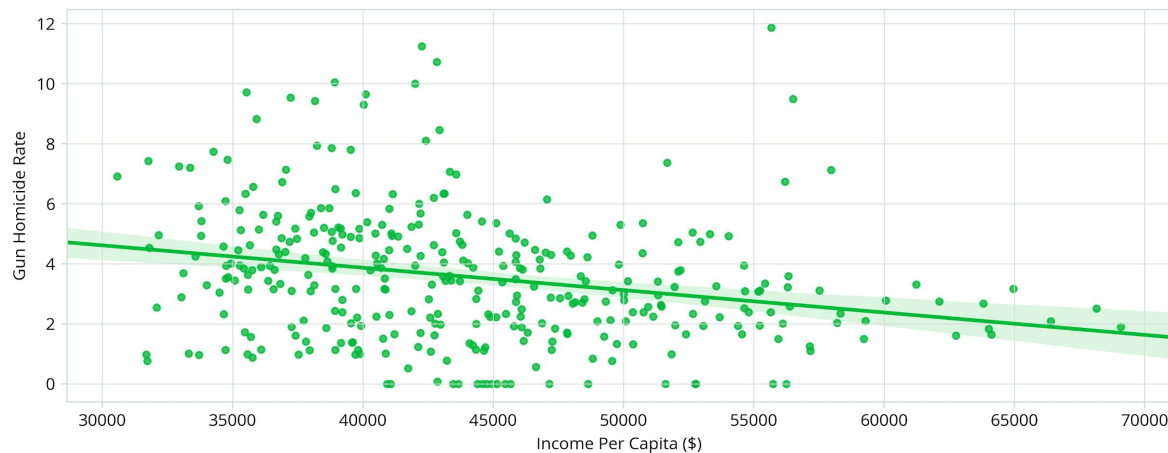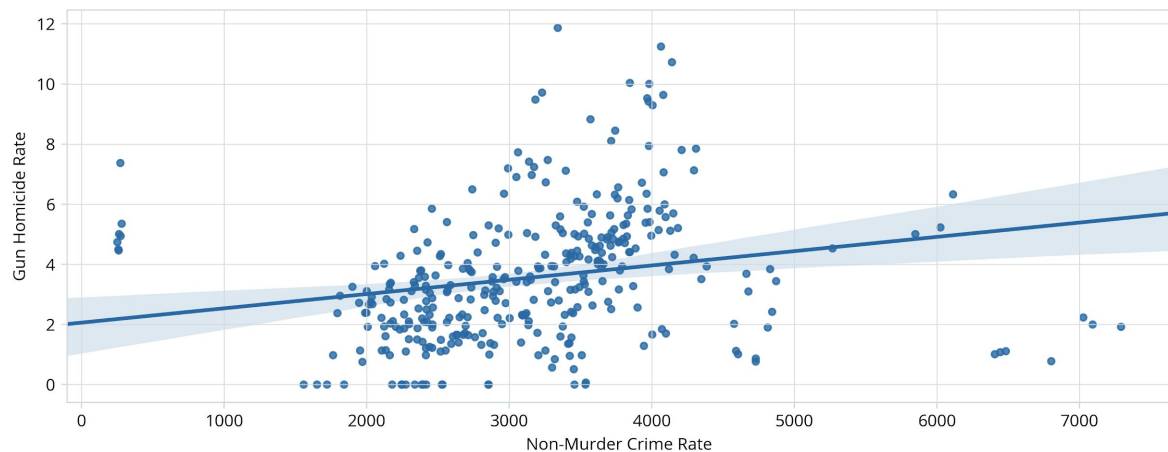
Here, the trends for weapons registered are plotted against gun homicide rate trends for a random subset of states.

Mental Illness Rate and Gun Homicide Rate Trends (2012-2016)

Again, we can see here that **gun violence trends follow the rate of mental illness** within each state, especially in the **highlighted states**.
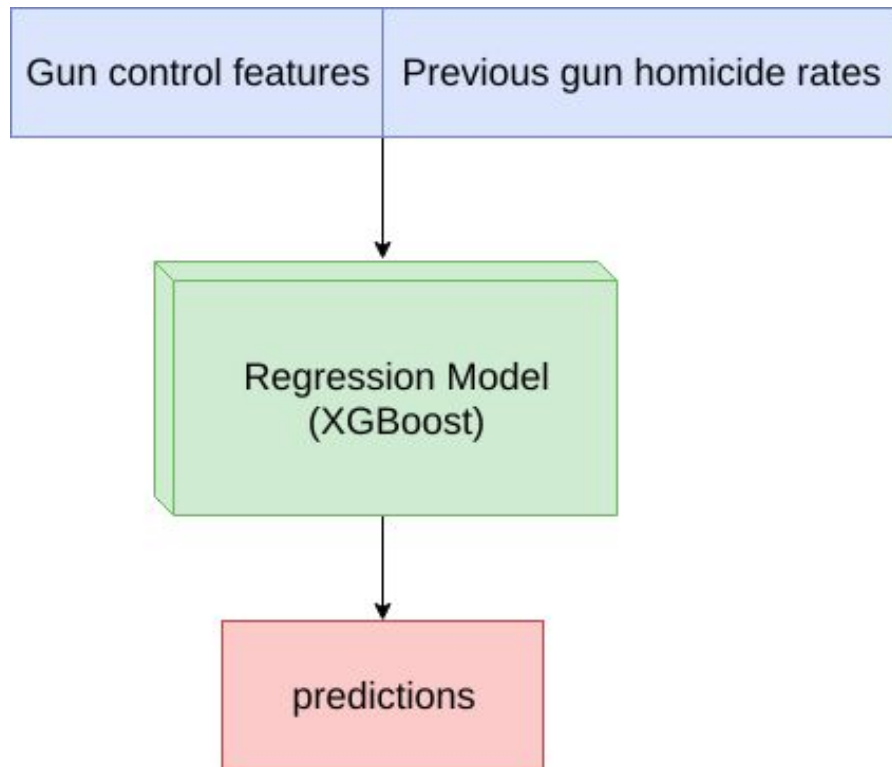
Gun Violence Correlation With Other Features

In general, gun homicide rates are **positively correlated with other crimes (non-murder crimes)** and **negatively correlated with income**.

Can we use data to predict gun violence increases in different states?

Model Pipeline

We trained a model that takes features about **gun control provisions and previous gun homicide rates** as input.

The model **predicts whether gun violence will go up by more than 20%** next year for each state.

Results for Predictions on 2017 Gun Homicide Increases

	Normal Sensitivity	High Sensitivity (for better recall)
Accuracy	85%	80%
Recall	43%	86%

The model predicts whether a state will see a 20% increase in gun homicides with **80% accuracy and 86% recall rate** for 2017.

The model showed significant improvements in performance when given more data to learn from.

As more data becomes available, such analysis may become an important asset in effective lawmaking.

Dramatically increasing gun violence United States desperately calls for immediate action.

Significant correlations were found between stricter gun control provisions and reduced gun violence. Further exploration of this correlation may lead to a solution to America's growing gun problem.