INTRODUCTION
The U.S. has the highest rate of gun ownership in the world with an average of 88 guns per every 100 people (Chalabi, 2012). It is unsurprising that the U.S. also has one of the highest rates of gun-related homicides among developed countries. In fact, in 2016, an estimated 27 people died from gun homicides every day of the year, corresponding to a gun homicide death rate of 31 per million people (Quealy and Sanger-Katz, 2016). In addition to high rates of gun homicides, 60% of gun deaths were attributed to gun-suicides (Sanger-Katz, 2015). Across the nation with the greatest number of guns and gun-related deaths, Americans have become desensitized in many ways to gun violence. Yet, school shootings consistently shake even the most hardened politicians to recognize the objective evil of exposing school children to gun violence and death in the very places that should protect and educate them. Since the 199 Columbine High School massacre killing 13, there have been 224 school shootings impacting 219,000 students (Cox et al., 2018; see Map 1).

It is undeniable that the U.S. has a gun death problem, but proposing effective policy can be difficult. I explore variation in school shootings to understand related patterns – and whether these patterns are consistent with patterns explaining the wider gun violence issue in the U.S. – and its policy implications.

FINDINGS & RESULTS
After viewing the general map of all school shootings in the U.S. since 1999, the research question remained regardless whether there might be any observable patterns or root causes to better understand school shootings. While one hypothesis might be based on the relative strength of each individual state’s gun laws, Map 2 shows that there is no observable relationship. There are still many casualties from school shootings in states like California and Minnesota despite their relatively stronger gun safety laws. However, in other states with relatively weaker gun laws like Montana, New Mexico, and New Hampshire there are less casualties from school shootings. Thus if the number and level of severity of school shootings is not related to state gun laws, perhaps there are other related factors? Map 3 explores the relationship between school funding per capita at the county level and school shootings based on racial diversity of the schools. While the evidence is not entirely conclusive, there seems to be a more positive association between school shooting events in more racially diverse schools in counties spending less money on education.

CONCLUSION & POLICY IMPLICATIONS
While there may be some relationship between school funding, racial diversity, and school shootings (there is not enough evidence to say this is a strong relationship, but one can make some inferences based on Map 3), there is definitely no relationship between strength of state gun laws and U.S. school shootings. If Map 2 were redrawn with gun murder rates and homicides, there is a stronger relationship between weaker state gun laws and an increase in gun murders and homicides.

In terms of policy, this suggests that the causes of gun murders and homicides in the context of crime are likely different from the causes of school shootings in particular. While strong gun control laws at the state level can be an effective policy to curb gun crime, they will likely not be an effective policy to curb school shootings. Instead, these maps imply that policies to curb school shootings should focus more on school resource equity and racial diversity of the school. Others have hypothesized that school shootings may be correlated with mental illness. However, studies have found that there is no direct causal link between mental illness and school shootings (Mietz & MacLeish, 2015). Rather, mental illness may just be another factor in a complex puzzle of socioeconomic status, race, propensity for violence, gender, and school resources. Further studies and maps should be explored to discover other trends for school shootings beyond just the state of California.

Ultimately, the issue of gun violence in the U.S. are often spoken about as a monolithic policy issues, but it may be in the nation’s best interests to disaggregate policy recommendations geared to address gun crimes in terms of murder and homicide, suicides (which are a growing cause of gun-related deaths), and school shootings.

REFERENCES
Spatial Data: U.S. Census Bureau; Washington Post
Other Data: Washington Post, FiveThirtyEight; Cato Institute; Everytown; California Department of Education; U.S. Census Bureau

All figures are projected as North America Albers Equal Area Conic.