

Public Health Gun Policy Reform

Leveraging Statistical Analysis for Insights and Solutions

Population Health Informatics Course Project
Kenzie Baker

Introduction

- The beginning of gun violence being viewed as a critical public health concern in the United States
- Utilize statistical analysis and evidence-based reasoning of national and state data
- Employ quantitative methods such as trend analysis, spatial mapping, and time series forecasting
- Embrace a multidisciplinary approach from public health, criminology, and sociology
- Uncover patterns in gun-related incidents, including fatalities, injuries, and crimes
- Contribute to the development of effective prevention strategies for safer communities

Economic Burden of Gun Violence

- Gun violence injuries cost victims and families over \$1 billion annually in initial direct medical expenses alone.
- Increased school security measures cost over \$3 billion annually, straining school budgets.
- Gun violence slows business development, reducing new business formation and job opportunities.
- Housing prices decline in areas with higher rates of gun violence, leading to economic disinvestment.

(Beyer, 2022)

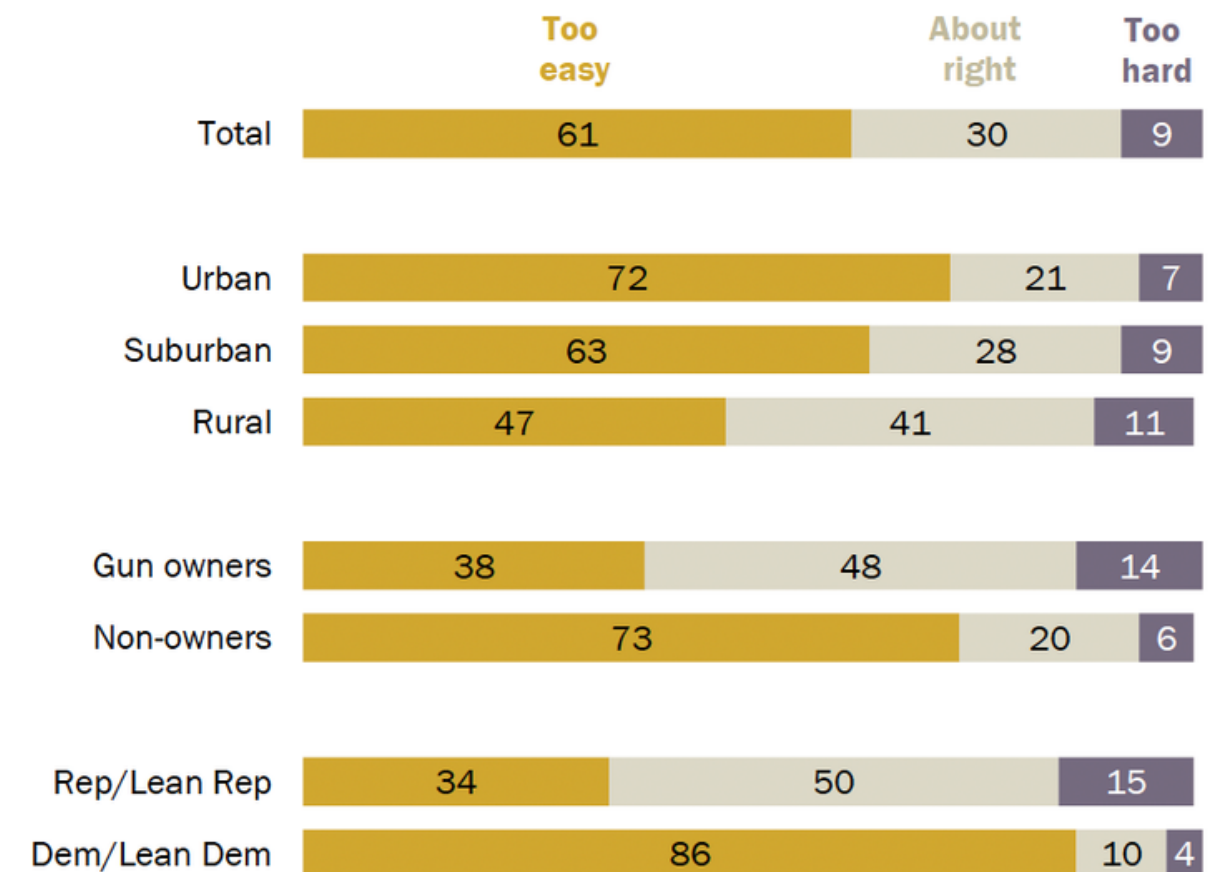
Public Opinion

- ~ 1/3 of U.S adults own a firearm
- Personal protection is the primary reason cited for owning a firearm
- Six-in-ten Americans see gun violence as a very big problem, with expectations of increasing violence in the future
- Most Americans believe it is too easy to legally obtain a gun.
- About six-in-ten U.S. adults favor stricter gun laws.
- There is broad bipartisan agreement on some gun policy proposals, but most are politically divisive.

USE PUBLIC HEALTH PERSPECTIVE

About 6 in 10 Americans say it is too easy to legally obtain a gun in this country

% who say it is ___ to legally obtain a gun in this country



Note: No answer responses are not shown.

Source: Survey of U.S. adults conducted June 5-11, 2023.

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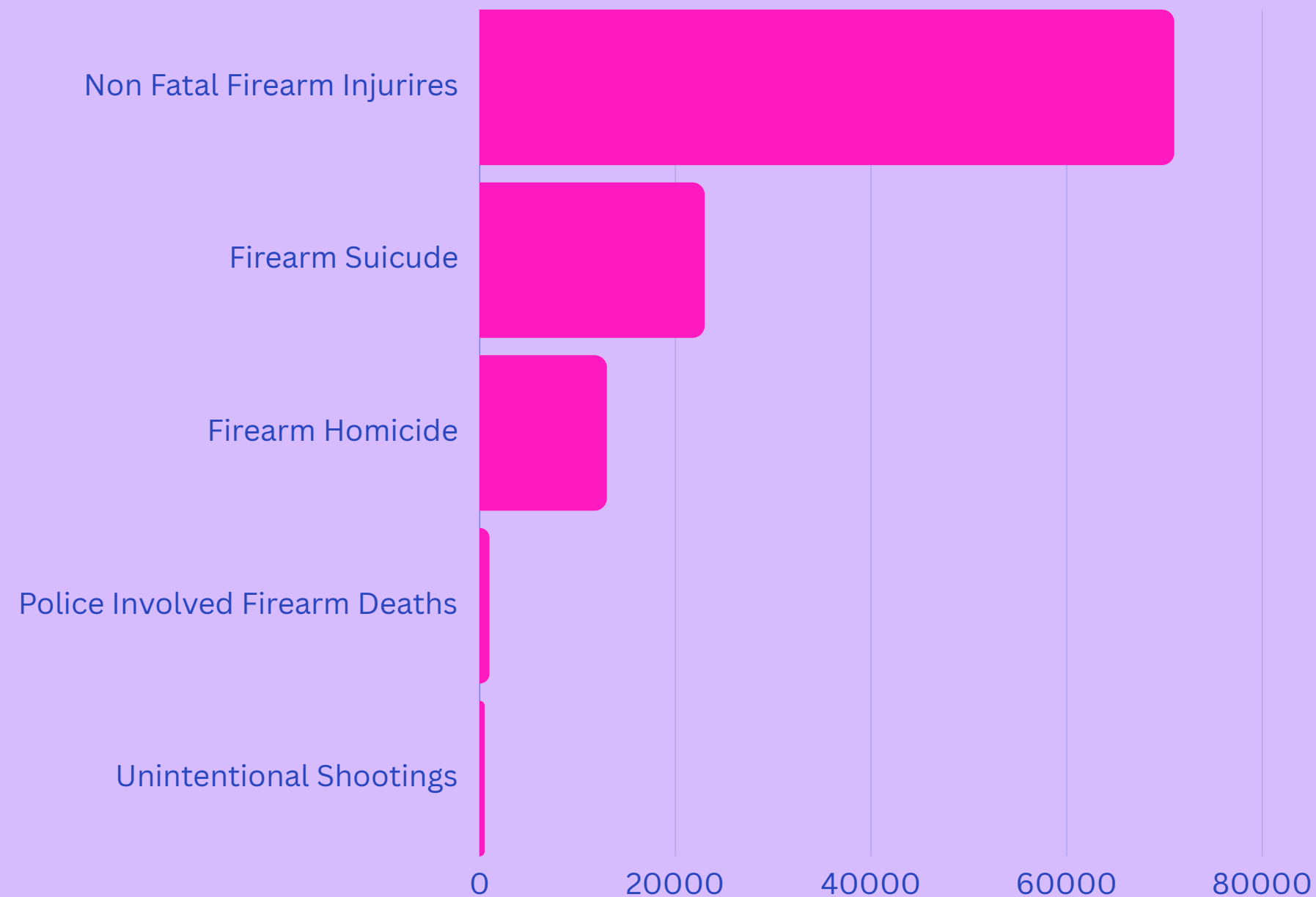
(Schaeffer, 2023)

Public Health Perspective

“We have used the public health approach to successfully eradicate diseases, reduce smoking-related deaths, and decrease car crashes. We can use this same approach to prevent gun violence in all its forms and strive towards a society where everyone can live free from gun violence”

(The Public Health Approach to Gun Violence Prevention)

Gun Violence Scope

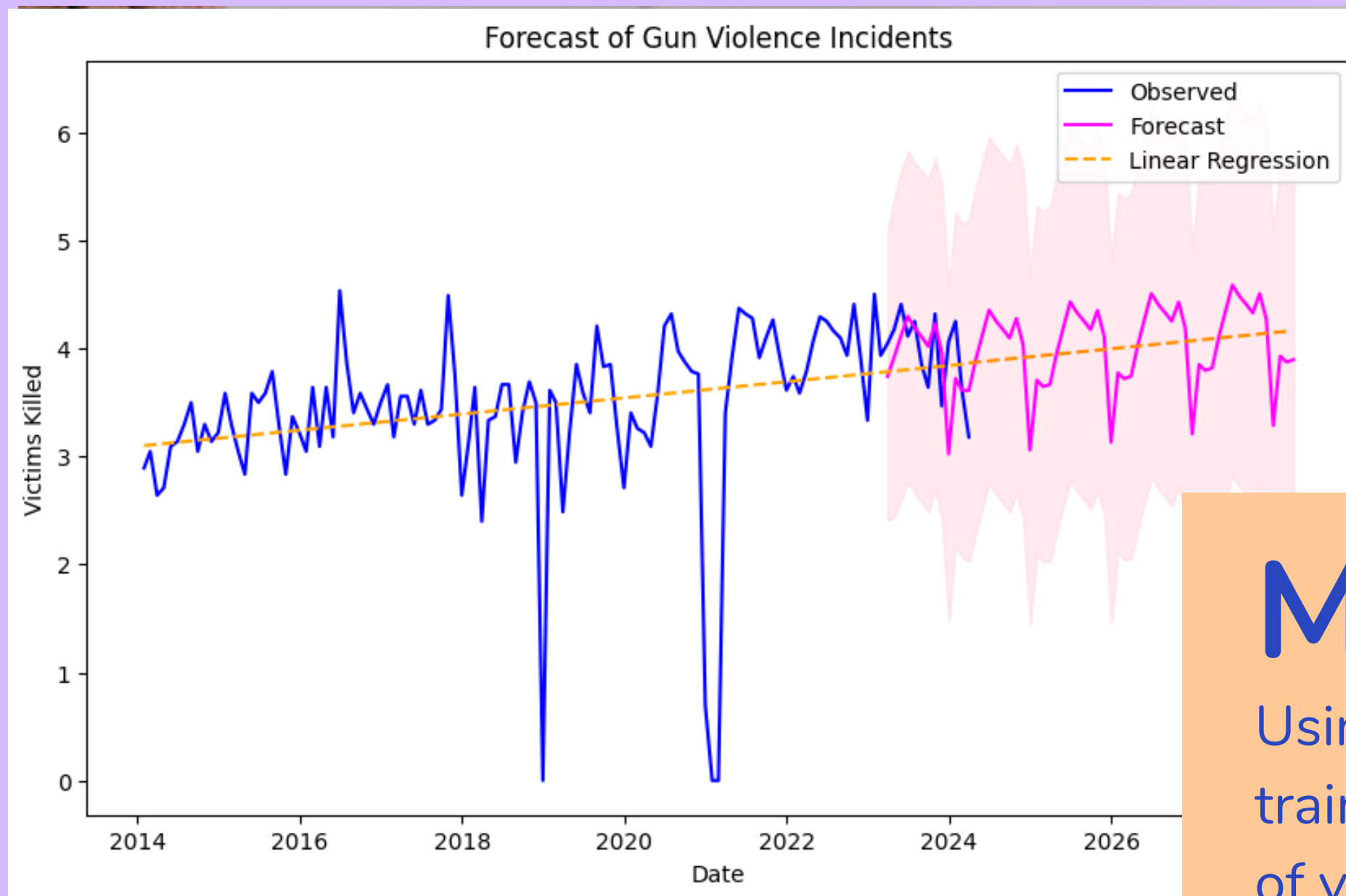


(Cook, 2018)

CDC and WHO outline a public health approach to violence prevention based on four steps:



<https://www.cdc.gov/violenceprevention/about/publichealthapproach.html>



Mean Absolute Error (MAE): 0.3322493190831439
Mean Squared Error (MSE): 0.17597169725572598
Root Mean Squared Error (RMSE): 0.419489805902033

Data Source: (Gun Violence Archive, 2014-2024)

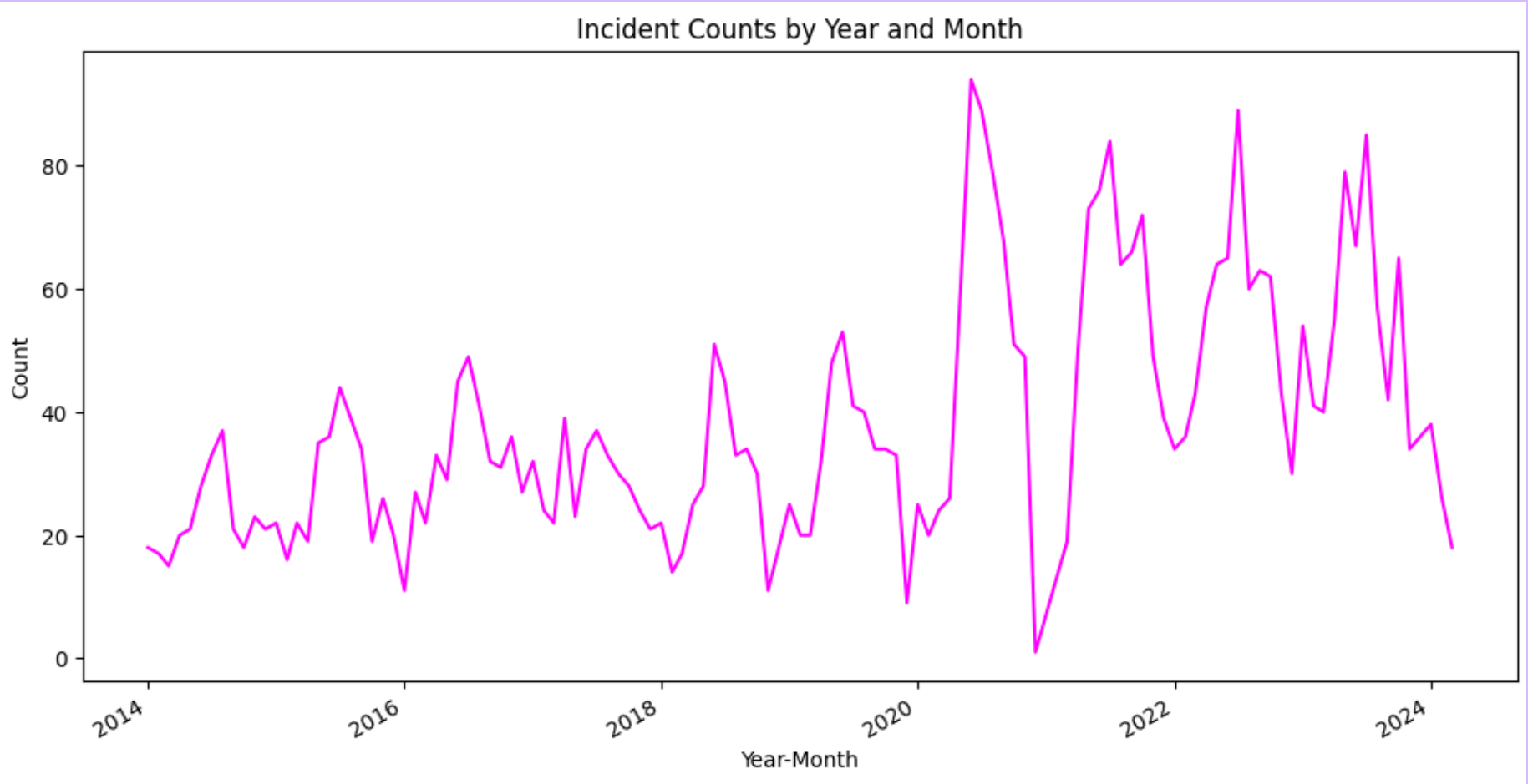
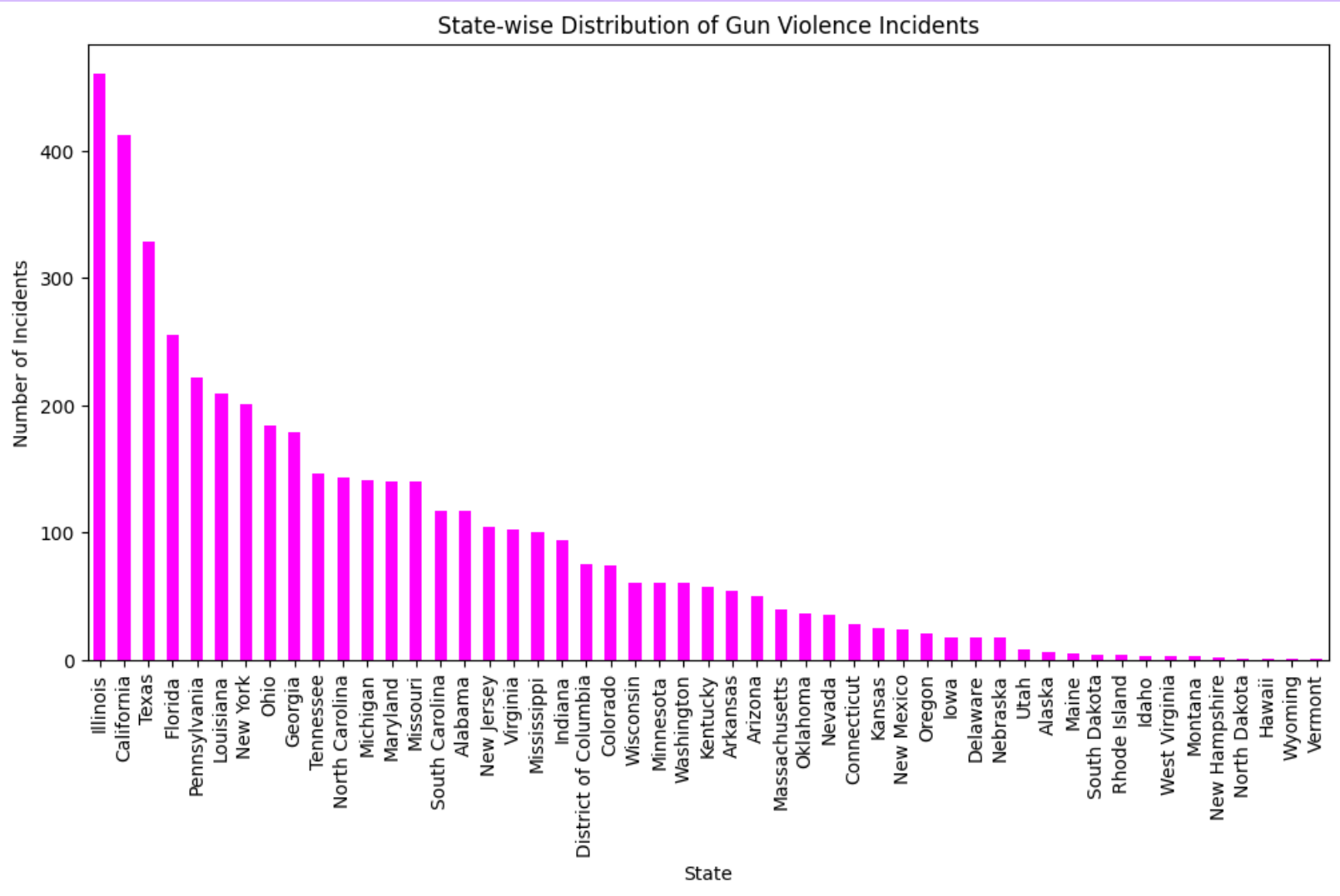
My Analysis

Using gun violence data from 2014 to 2024, I trained a SARIMA Model to forecast the number of victims killed from gun violence in the upcoming years.



Steady Increase

Descriptive Analysis



Recommendations



Better Data Collection

Federal, state, and local governments should collect more comprehensive gun violence data and make data public



Research Funding

Federal, state, and local governments, in addition to foundations and universities, should dedicate funding to research gun violence prevention.



Evidence-based Policies and Practices

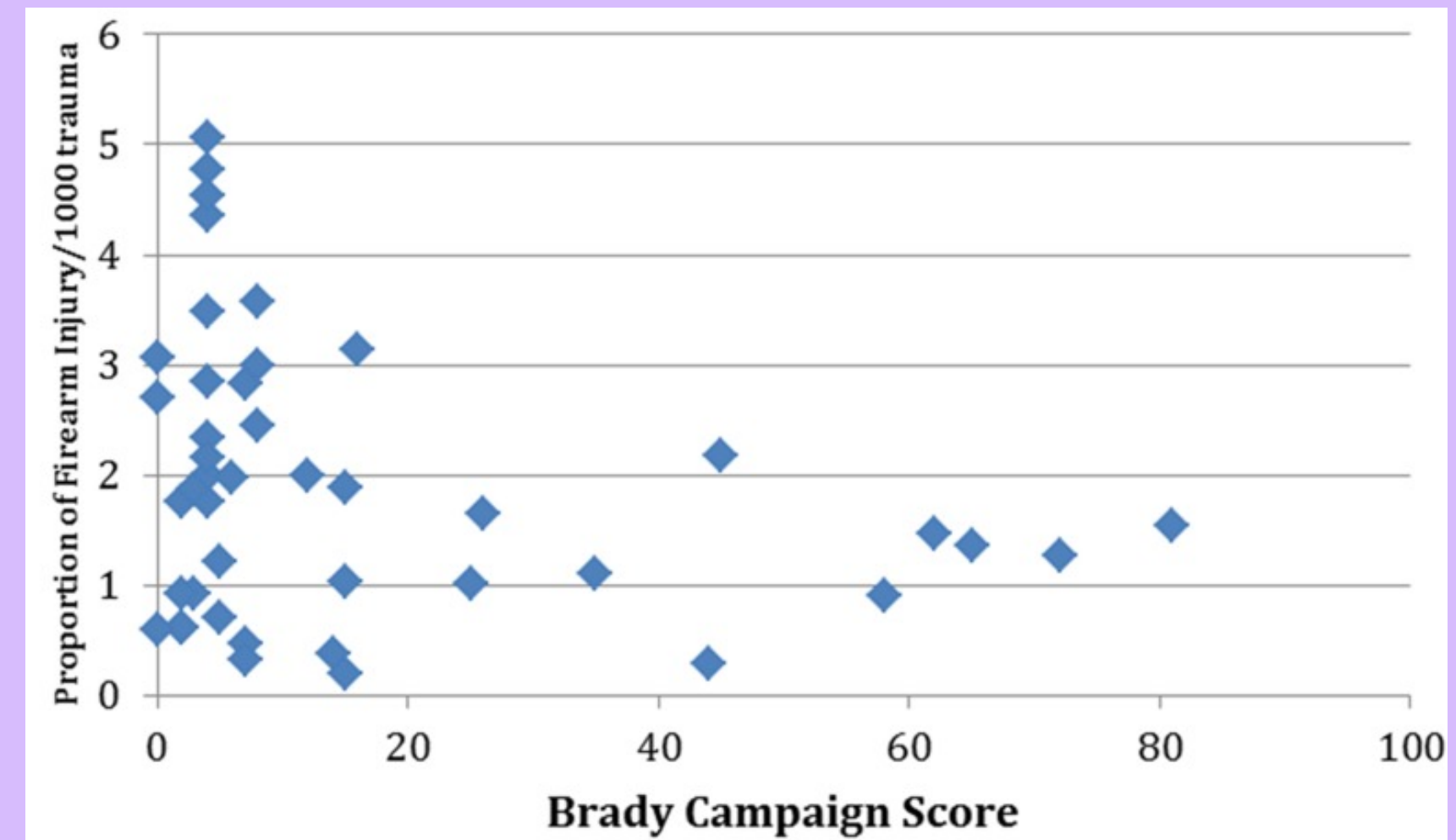
Firearm Purchaser Licensing, Extreme Risk Protection Order, Community Violence Intervention, Safe and secure gun storage, Public carry of firearms

(Hopkins, n.d.)

Effects of Putting Recommendations into Place

- Stricter firearm laws associated with lower rates of firearm-related injuries and mortality
- States with strict firearm laws (SFL) have significantly lower rates of firearm-related hospital admissions
- Potential Years of Life Lost (PYLL) are significantly lower in SFL states, indicating fewer premature deaths
- Correlation analysis reveals a negative correlation between Brady score and rates of firearm-related hospital admissions
- Stricter firearm laws associated with lower rates of suicidal and unintentional firearm injuries

(Joseph, 2018)



On Pearson's correlation analysis, the rate of firearm related injuries was found to be negatively correlated with Brady score (R^2 linear=-0.07; $p=0.04$) and had a correlation coefficient of -0.265

References

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THANK YOU

Questions?