
# Geographic Hotspots and Incident Repetition Analysis of Gun Violence in the United States

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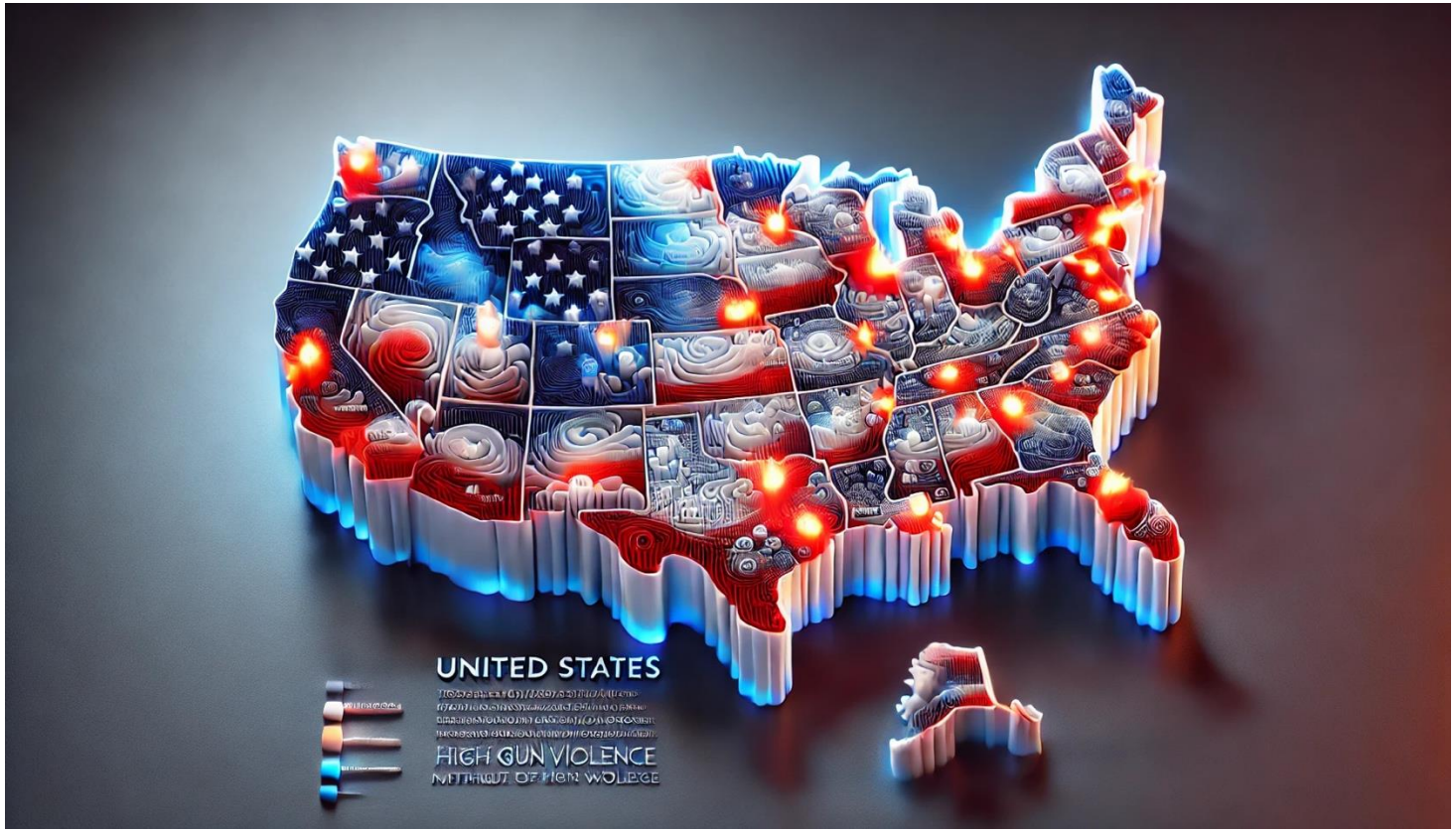
# Contents



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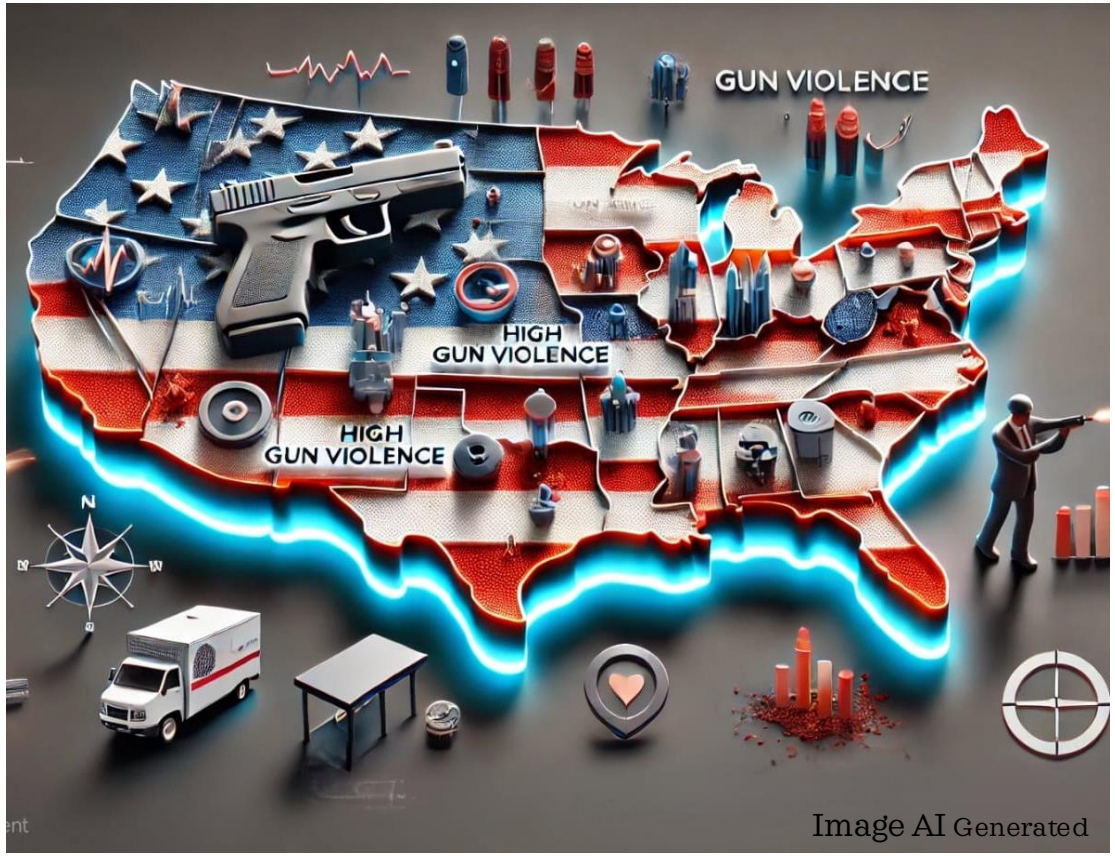
# Introduction

**Research Topic**: Geographic Hotspots and Incident Repetition Analysis of Gun Violence in the United States

**Objective**: Build an ETL data pipeline to

1. Identify high-risk areas for gun violence
2. Explore patterns of escalation or repetition.

**Focus**: Analyze gun violence trends and hotspots across U.S. cities and states



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# Data Sources

**FiveThirtyEight Gun Deaths Dataset (2011-2014) [1]**:

1. Contains data on **gun-related deaths** across the U.S.
2. Includes information such as **intent**, **age**, **sex**, **race**, **place**, and **education**.
3. Focuses on **demographic and geographic trends** in gun violence fatalities.

**Jamesqo Gun Violence Incident Data (2013-2018) [2]** :

1. Provides information on **gun violence incidents**.
2. Includes details such as **incident date**, **location**, **casualties**, **gun type**, and **incident characteristics**.
3. Focuses on **frequency** and **severity** of incidents at **city and county levels**.



# Methodology 1st part

**ETL Pipeline process:**

- **Extract: FiveThirtyEight:** HTTP fetch → CSV load
- **Jamesqo:** .tar.gz download & extract
- **Transform: FiveThirtyEight:** Drop missing critical data; Fill missing values; Standardize text
- **Jamesqo:** Drop missing key data; Convert date columns; Fill missing values
- **Load:** SQLite databases & CSV files (for further analysis)

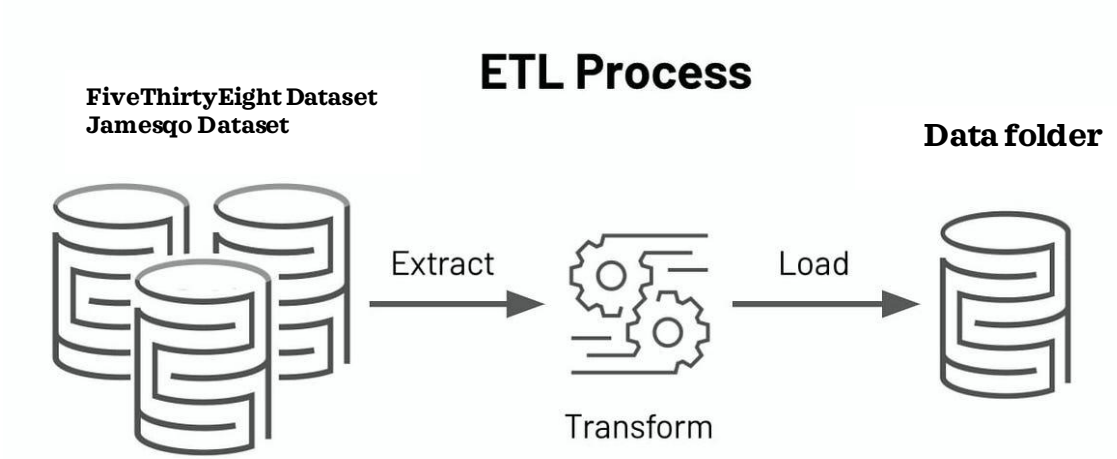


Fig1: The ETL data pipeline architecture [4]

# Methodology 2nd part

**Geographic Analysis**: Identified regions with the highest fatalities and injuries.

**Temporal Analysis**: Applied 3-month moving average to identify trends and spikes.

**Demographic Analysis**: Analyzed characteristics such as race, gender, and education level.

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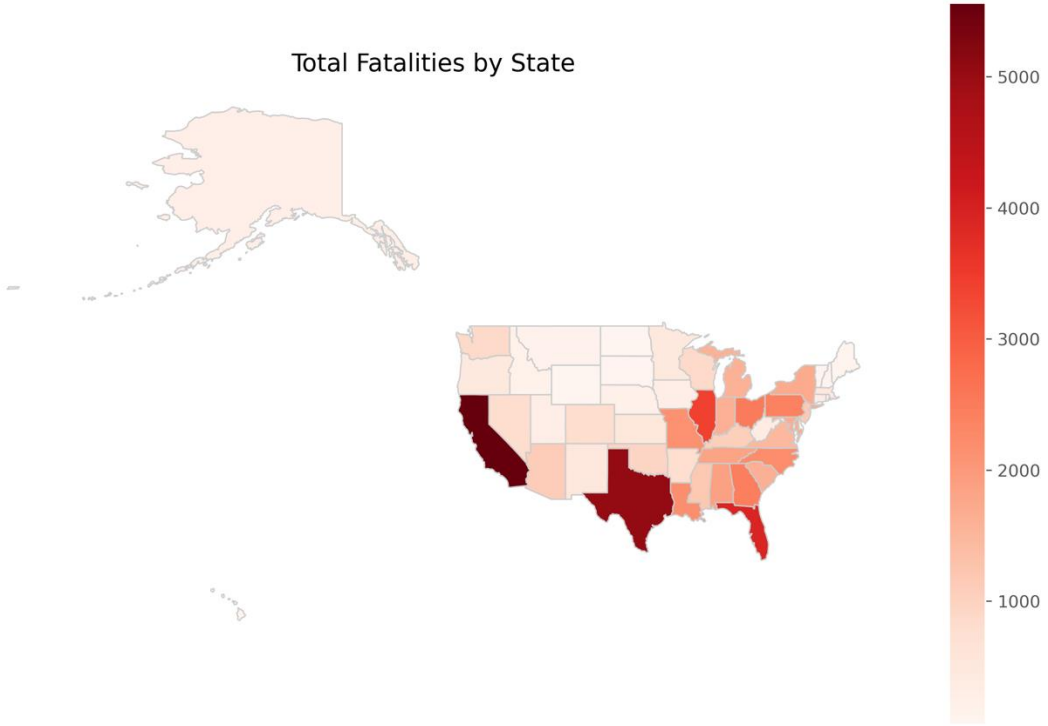
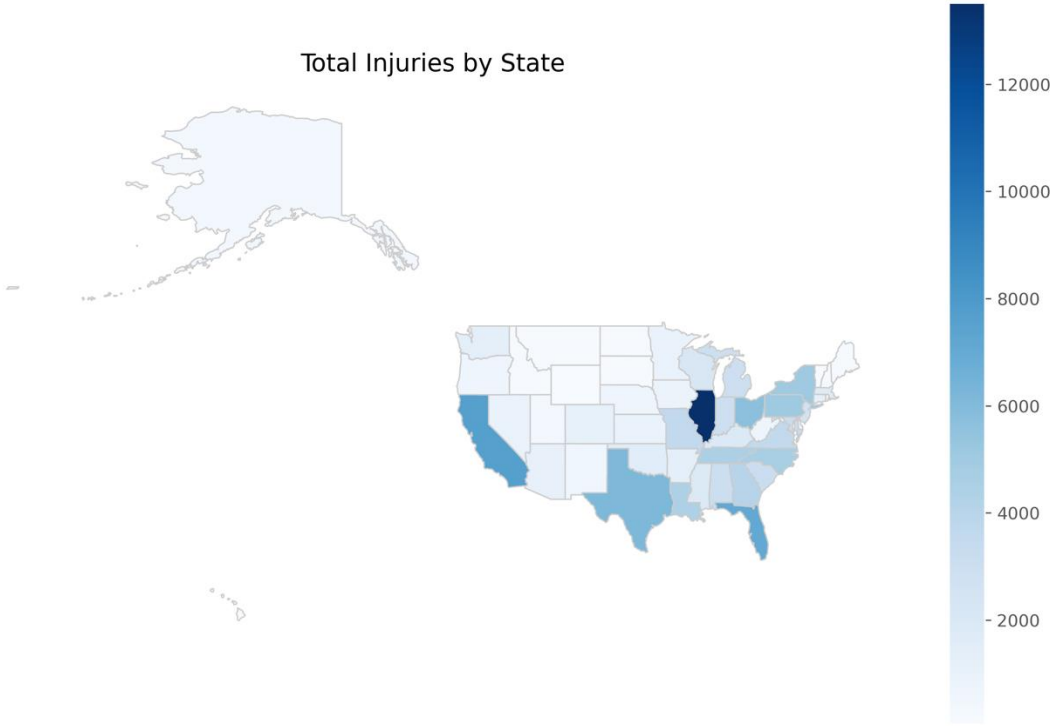



# Results and Interpretation (1/3)

**Illinois:** 3,409 fatalities; 13,151 injuries.

**California:** 5,562 fatalities; 7,644 injuries.

**Texas:** 5,046 fatalities; 6,106 injuries.

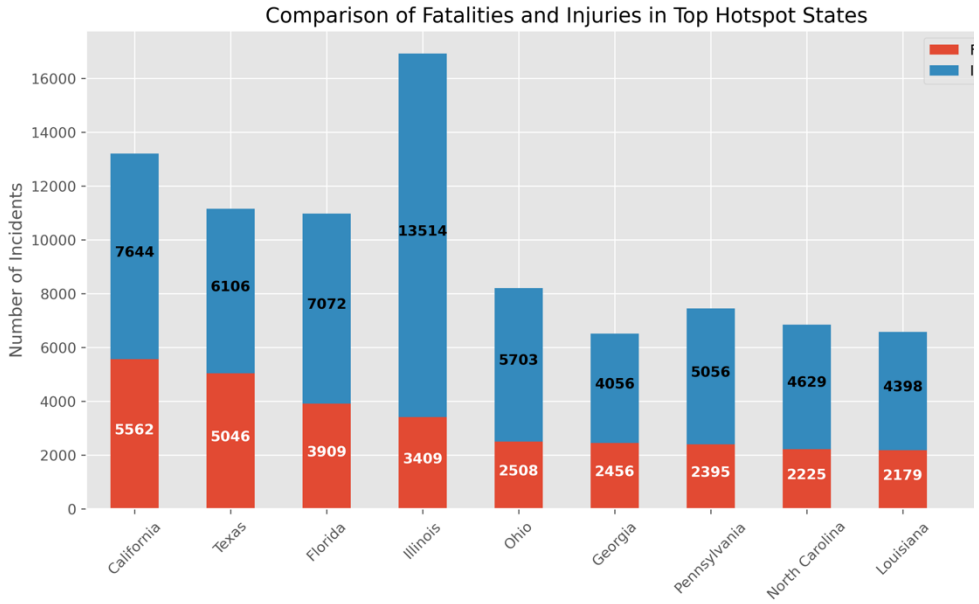
# Results and Interpretation (1/3)

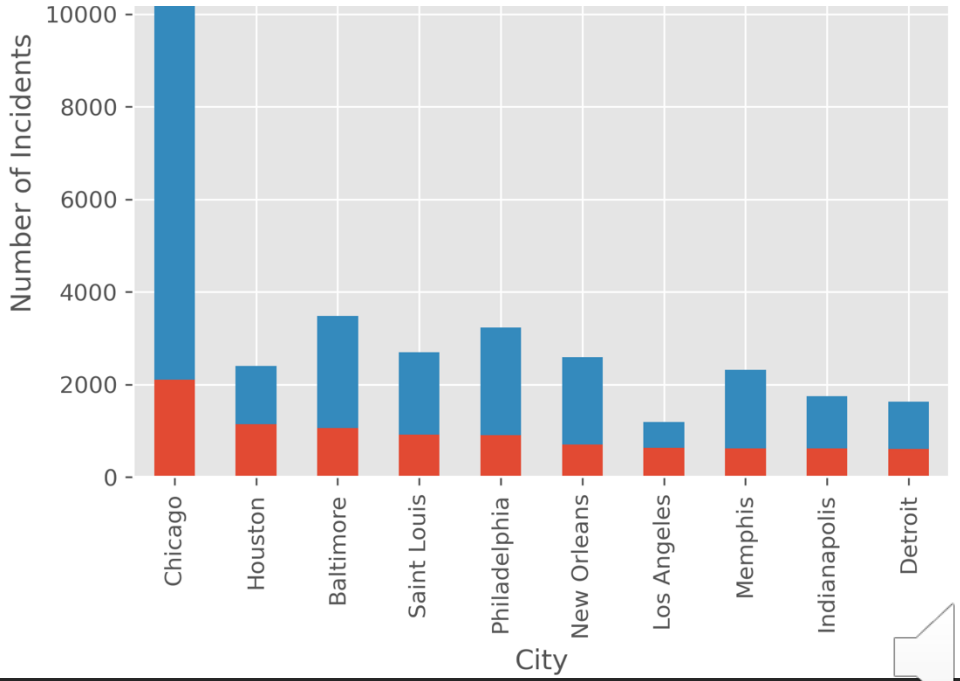
**Geographic Hotspots**:

**Top States**: Illinois, California, Texas

**Top City**: Chicago (highest fatalities)

**Insight**: Targeted interventions in these high-risk areas are critical to reducing gun violence.



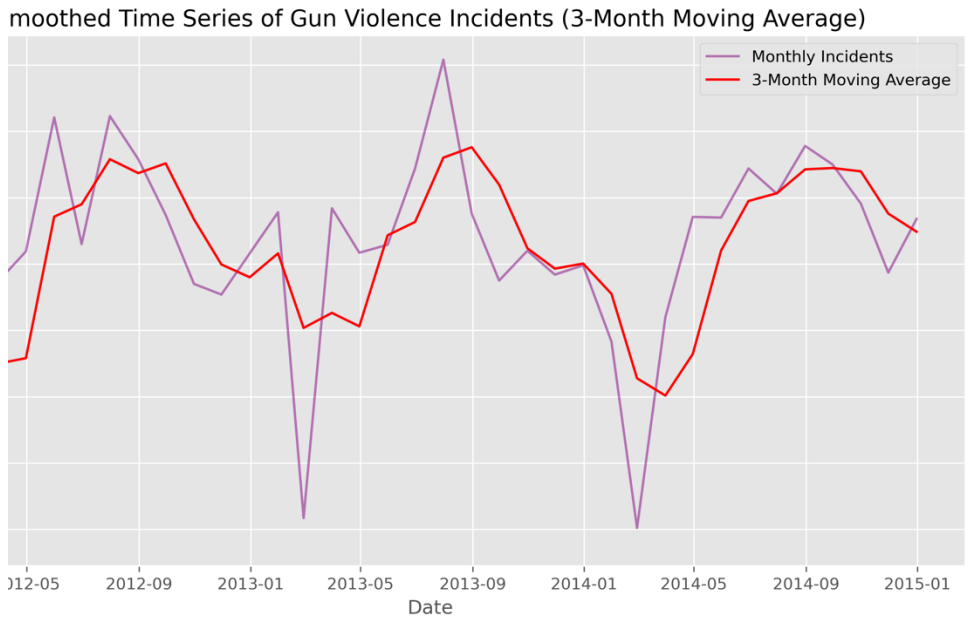



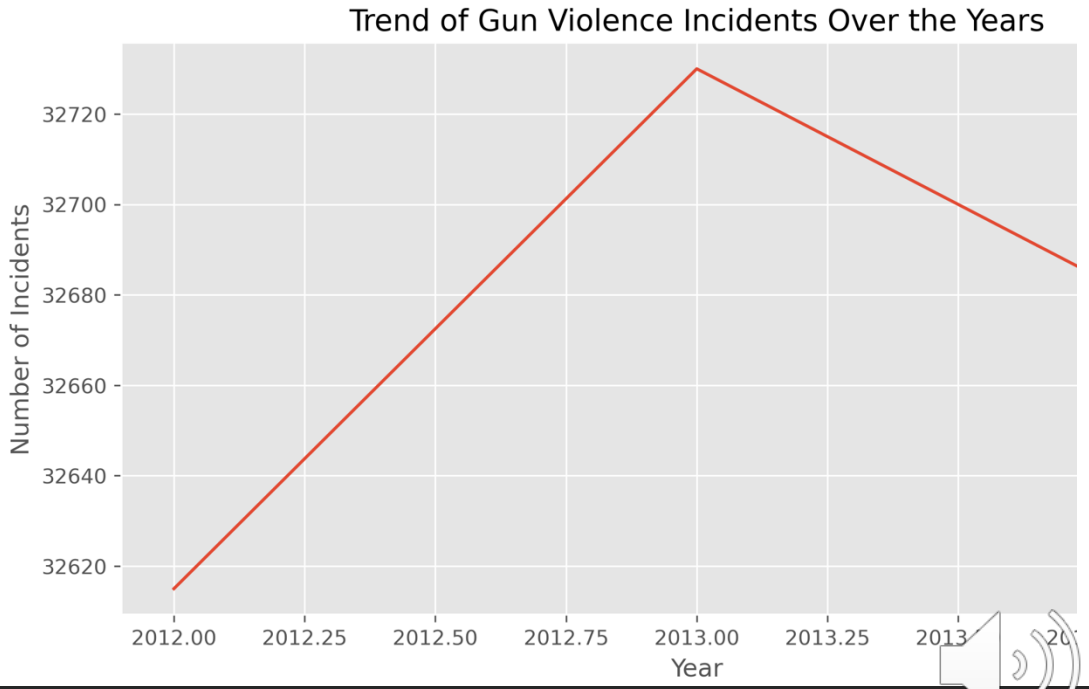
# Results and Interpretation (2/3)

**Temporal Patterns**:

**Escalation Periods**: Significant spikes in gun violence incidents during **2012-2013** and **2014-2015**.

**Insight**: These periods indicate escalation, suggesting the need for proactive, timely interventions.



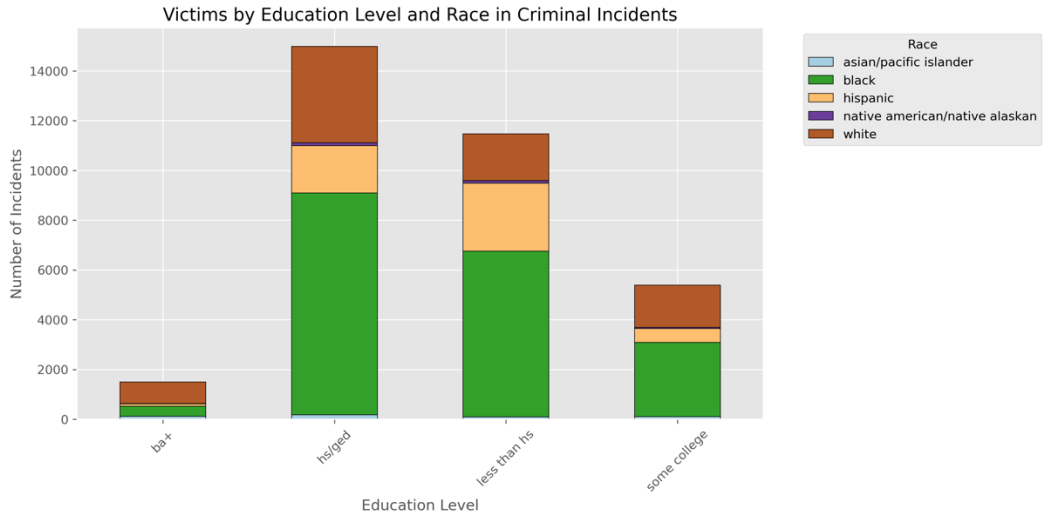
# Results and Interpretation (3/3)

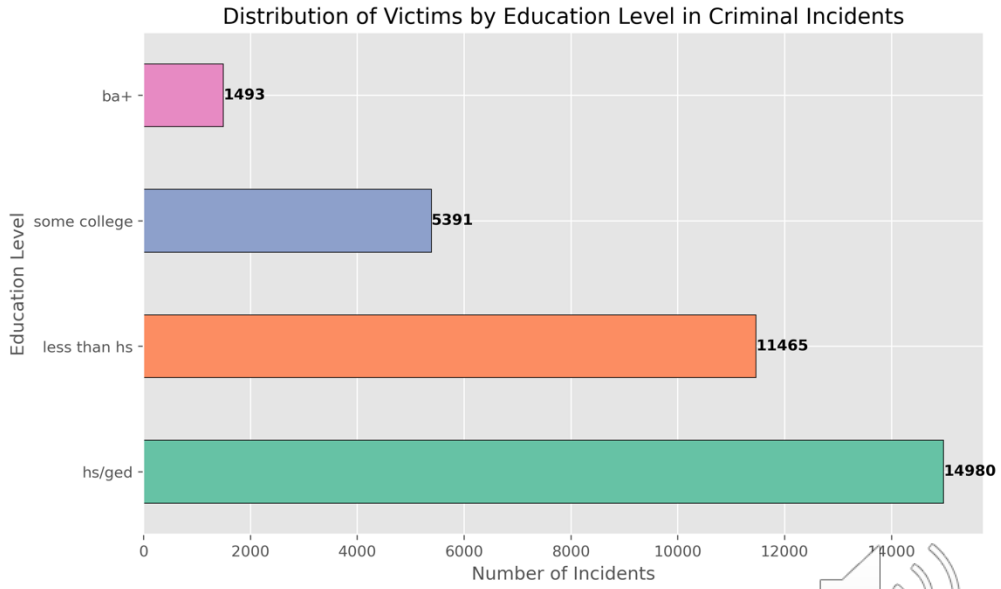
**Demographic Disparities**:

**Black Males**: Disproportionately affected by homicides.

**Education Levels**: Individuals with lower educational attainment, especially within the Black community, are more vulnerable.

**Insight**: Socioeconomic factors, such as education, should be prioritized in policy decisions to reduce vulnerability.



# Conclusion

**Disparities**: Black males and low-education individuals are most affected.

**Recommendations**:

1. Target interventions in high-risk areas and during escalation periods.
2. Address educational and socioeconomic factors.

**Future Research**:

Investigate the impact of gun control laws and mental health.

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# Reference


[1]. FiveThirtyEight, “Gun Deaths Dataset,” available at: https://raw.githubusercontent.com/fivethirtyeight/guns-data/master/full_data.csv, accessed on Nov. 26, 2024.

[2]. Jamesqo, “Gun Violence Incident Data,” available at: https://github.com/jamesqo/gun-violence-data/raw/master/DATA%2002013%2003-2018.tar.gz, accessed on Nov. 26, 2024.

[3]. Creative Commons, “Creative Commons Attribution 4.0 International (CC BY 4.0) License,” available at: https://creativecommons.org/licenses/by/4.0/, accessed on Nov. 26, 2024.

[4]. Comprehensive Guide to ETL: Extract, Transform, Load Processes and Best Practices in 2023,” *AIMind*, 2023. [Online]. Available: https://pub.aimind.so/comprehensive-guide-to-etl-extract-transform- load-processes-and-best-practices-in-2023-91d97bd67b21. [Accessed: Dec. 26, 2024]


Any question?
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