

# Role of Education in Reducing Crime in Chicago



NextGen Strategies

# DATA EDUCATION AND CRIME

Meet the Team

3

Project Overview

4

Data Overview

5

Education

6

Crime

8

Education and Crime

11

Recommendations

15

Conclusion

16

# Project Objective

## Business Problem

Chicago faces persistent challenges with crime rates impacting community safety and well-being. Addressing this requires actionable insights that can inform data-driven policies and interventions.

## Objective

Present actionable recommendations using data to reduce crime in Chicago.

- Explore the relationship between education and crime.
- Leverage visual analytics and storytelling to uncover insights.

## Key Stakeholders

- Chief of Police: To understand and act on crime patterns.
- Chicago Public Schools (CPS) CEO: To evaluate the role of education.
- Mayor: To drive policy decisions and resource allocation.
- Related Staff: To support implementation and follow-ups.



# Data Overview



## Crime Data

Public Safety Data from the Chicago Data Portal (2012–2014)

- 2012: [Link to Dataset](#)
- 2013: [Link to Dataset](#)
- 2014: [Link to Dataset](#)

### Original Dataset

- 30 columns with detailed data: census tracts, police beats, historical wards, etc.

### Final Dataset Used

- Reduced to 16 key columns to focus on actionable insights.
- Included:
  - Case Details: ID, Case Number, Date, Description, Primary Type.
  - Crime Context: Arrest, Domestic.
  - Geographic Information: Community Area, Zip Codes, Latitude, Longitude.
  - Year and Updates: Year, Updated On.

## Education Data

Chicago Public Schools High School Progress Reports (2012–2014)

- 2012–2013: [Link to Dataset](#)
- 2013–2014: [Link to Dataset](#)

## Geographic Data

Chicago ZIP Code Boundaries

- [Link to Dataset](#)

## Challenges

- High redundancy in the original dataset.
- Cleaning required to remove irrelevant and incomplete fields.
- Focused only on actionable columns for analysis.
- Merging education, crime, and geographic datasets required alignment across different formats and keys.

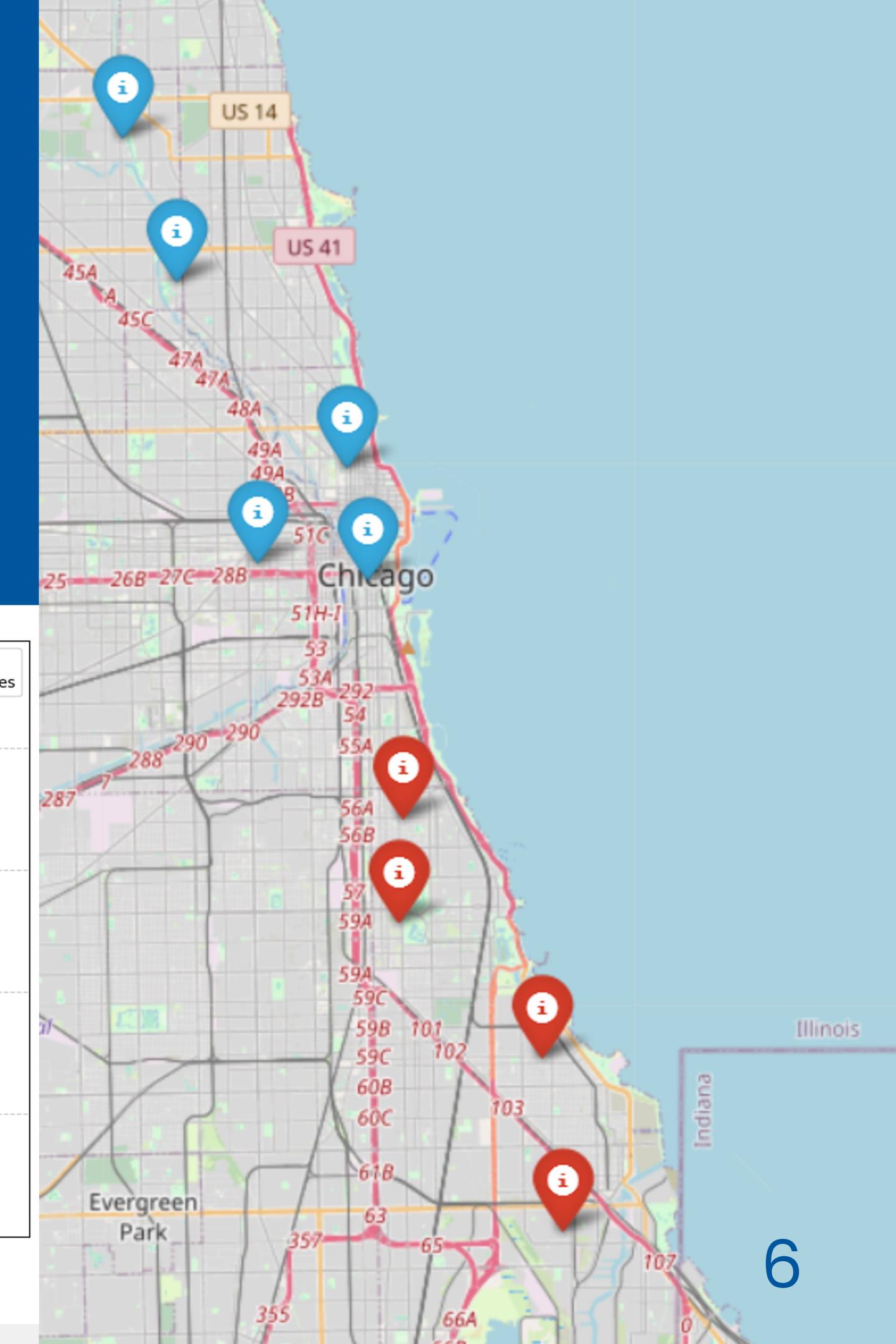
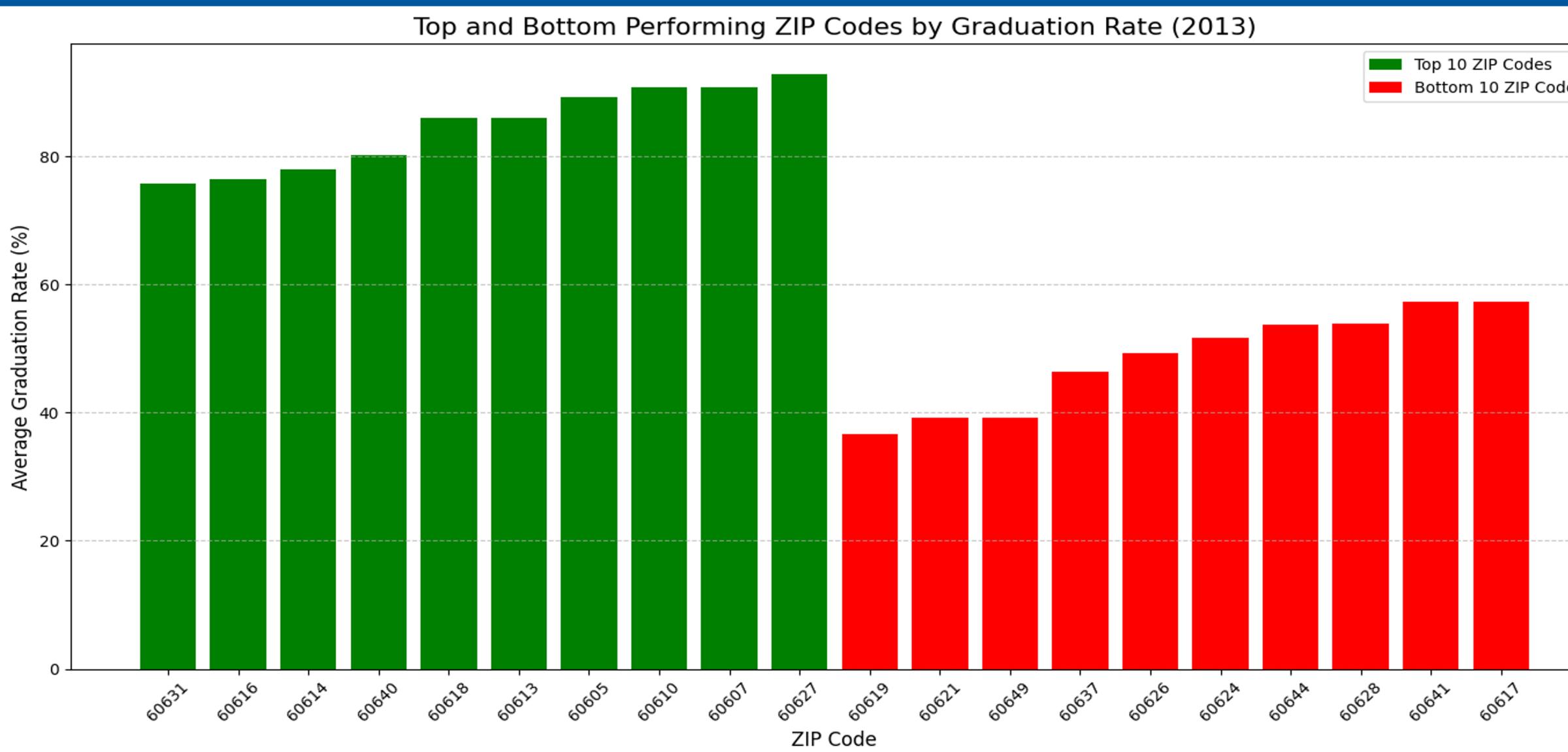
# Education

The bar chart highlights graduation rates:

- Top 10 ZIP codes achieve over 80%.
- Bottom 10 ZIP codes fall below 60%.

The map visually represents these disparities:

- Top-performing areas (blue markers) are concentrated in northern regions.
- Underperforming areas (red markers) are predominantly in southern neighborhoods.

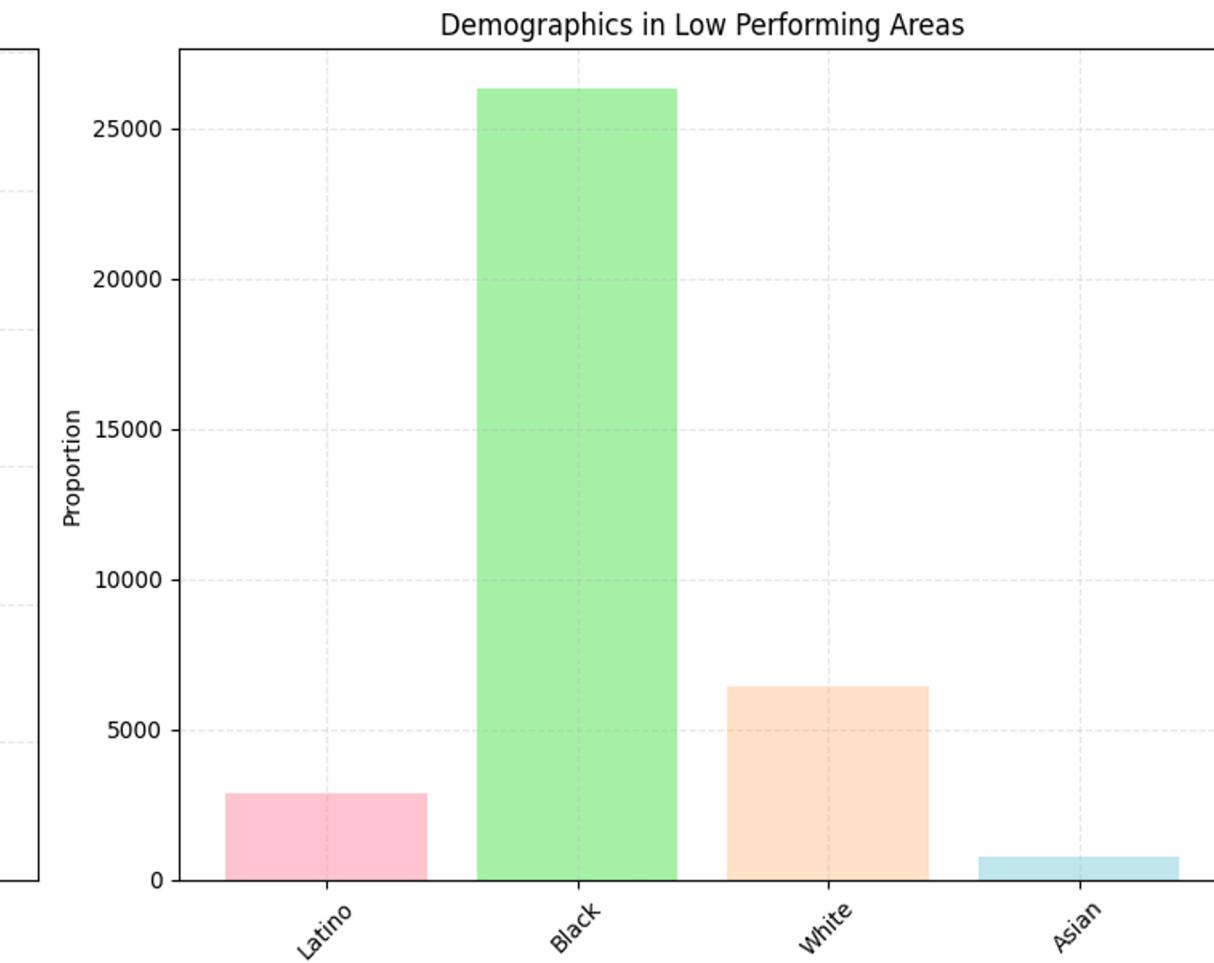
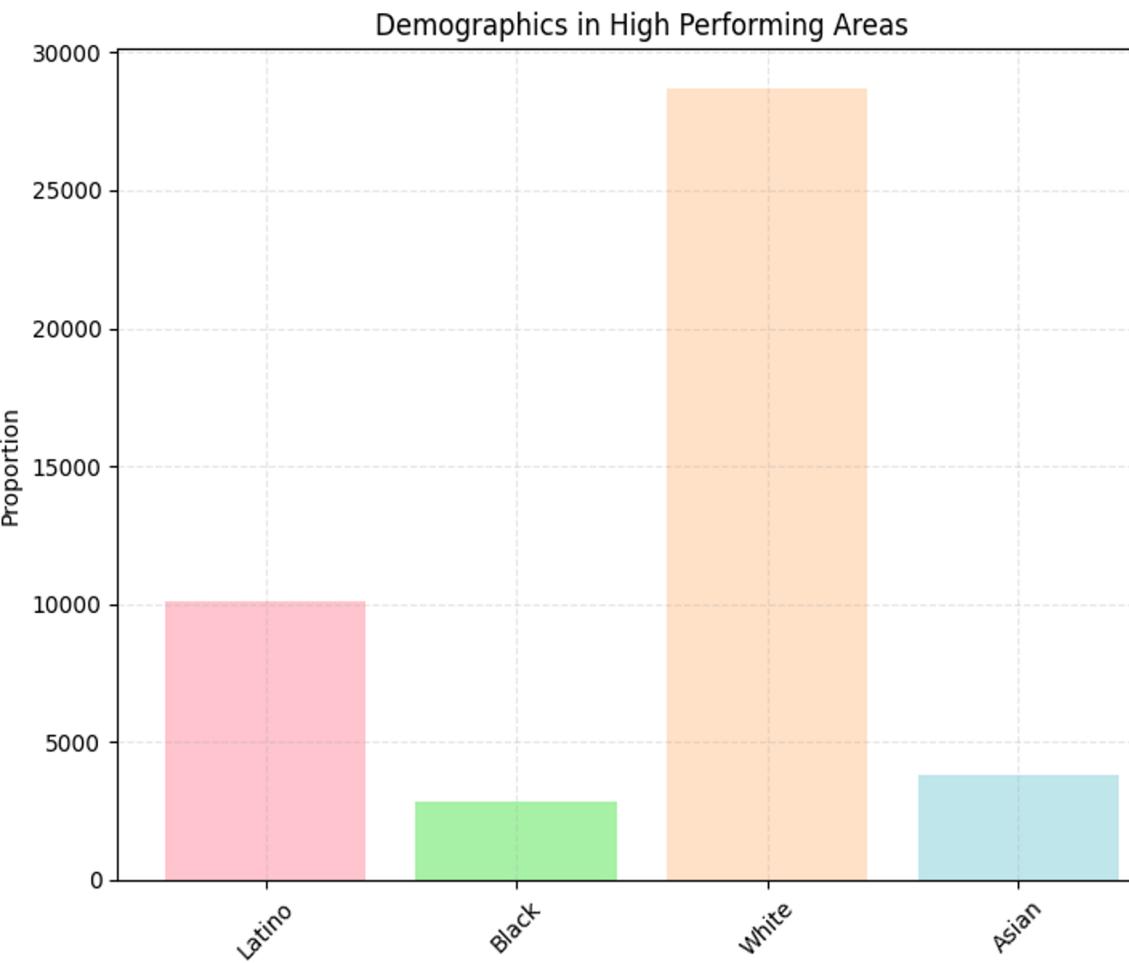


## • High-Performing Areas

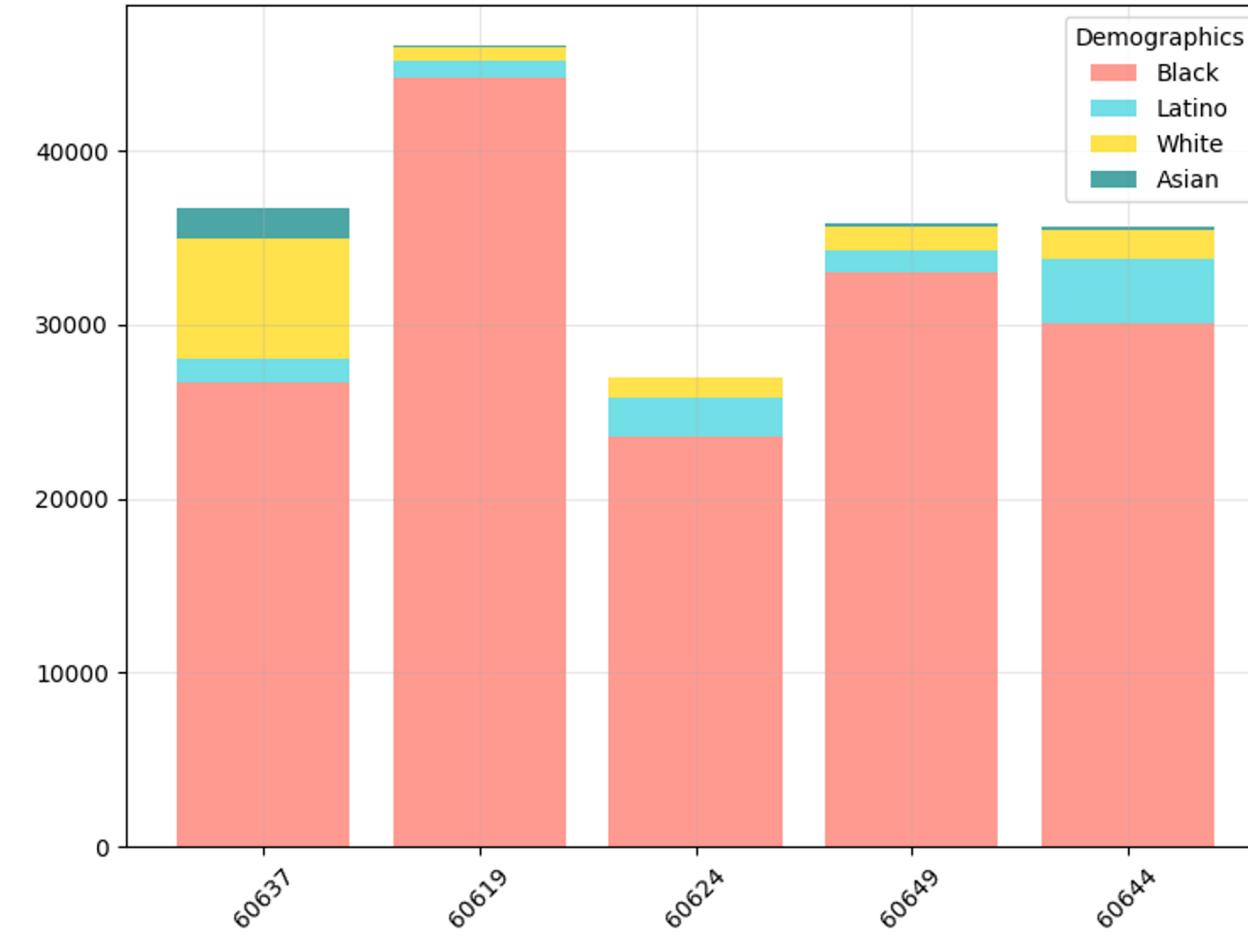
High-performing areas are mainly populated by White students, with smaller contributions from Asian and Latino communities. This diversity is linked to better graduation rates and access to resources.

## • Low-Performing Areas

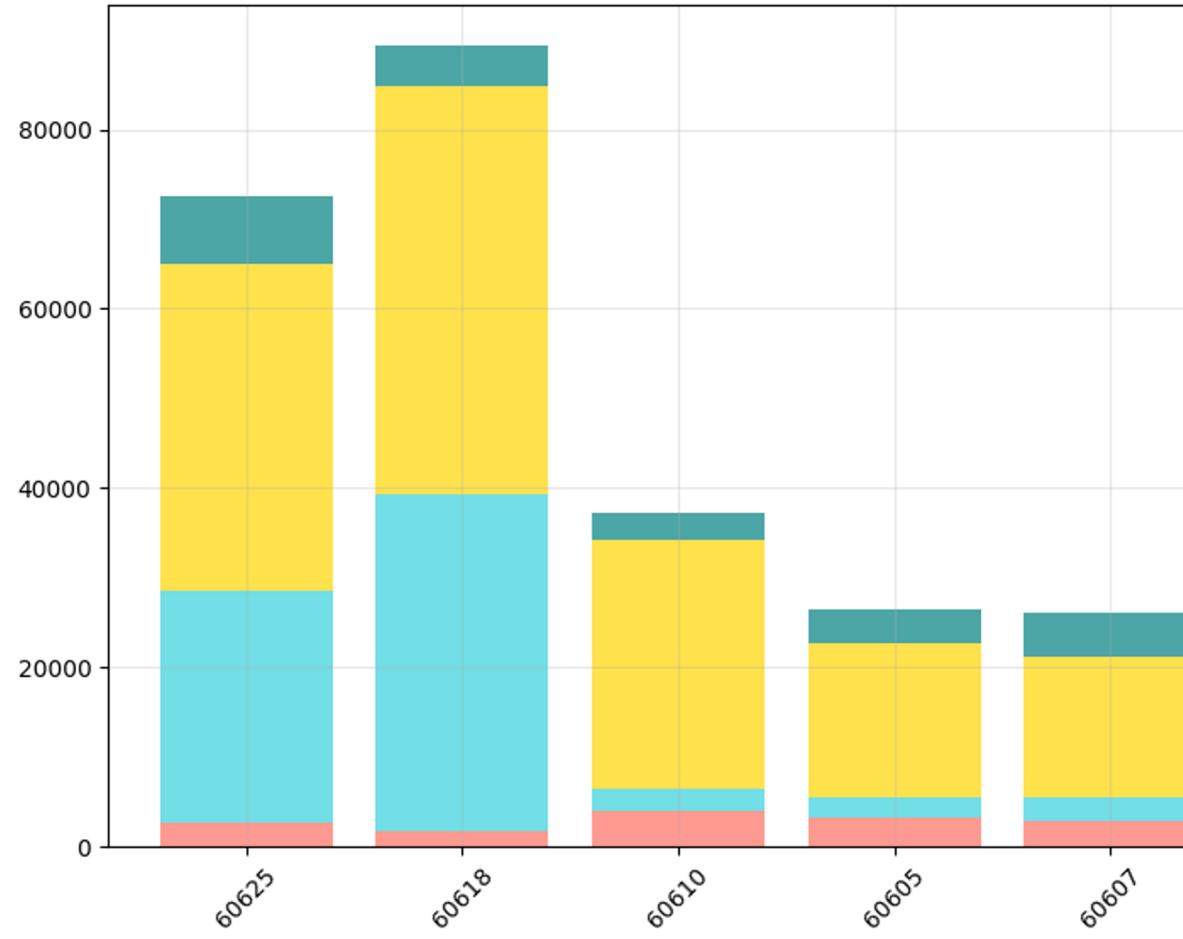
Low-performing areas have a majority of Black students, followed by White and Latino populations. These areas face challenges that lead to lower graduation rates and fewer opportunities.



Challenging Areas Demographics



Safe Areas Demographics



## • Challenging Areas Demographics

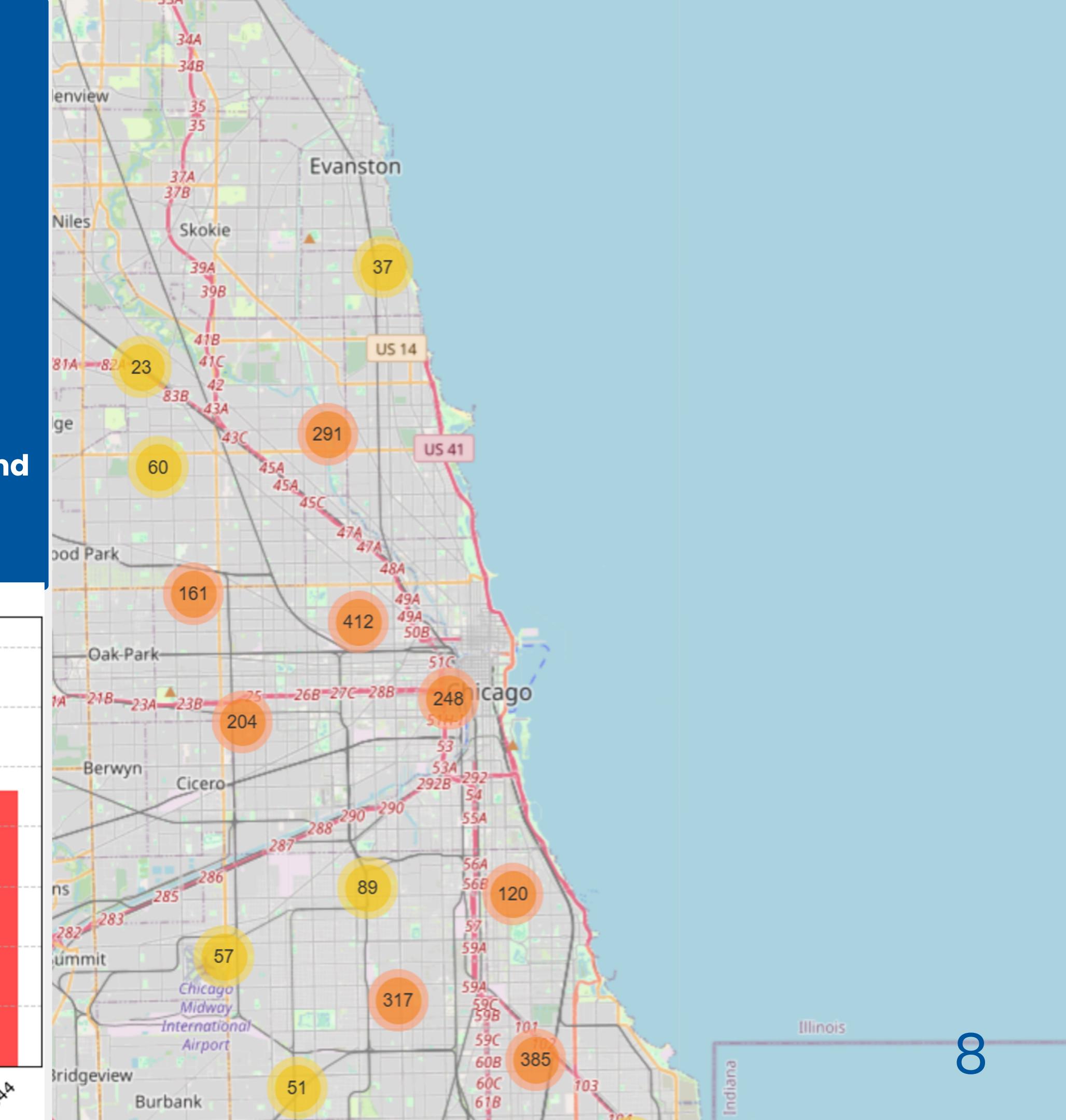
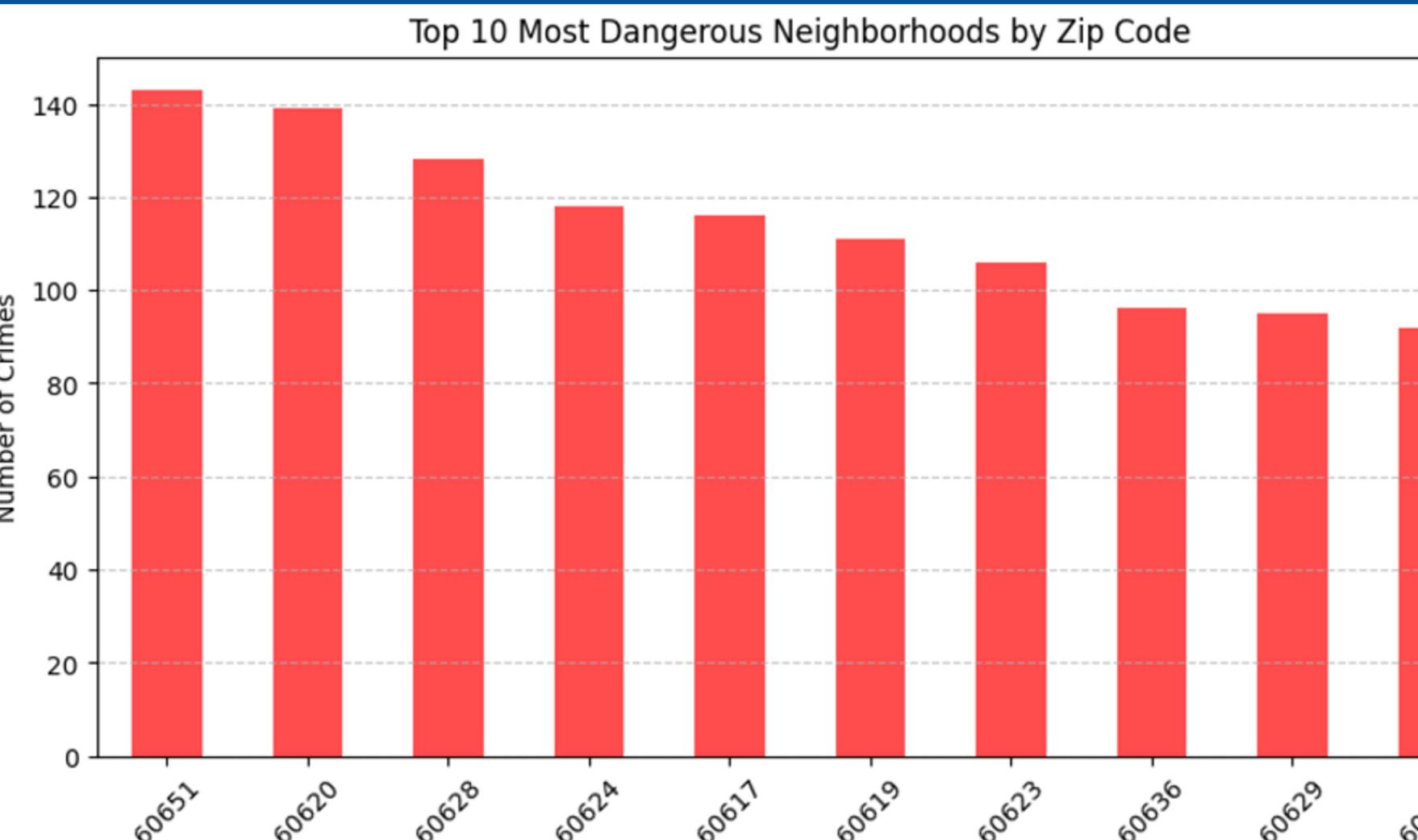
In challenging areas like ZIP codes 60619 and 60644, the majority of the population is Black, with smaller contributions from Latino, Asian, and White communities.

## • Safe Areas Demographics

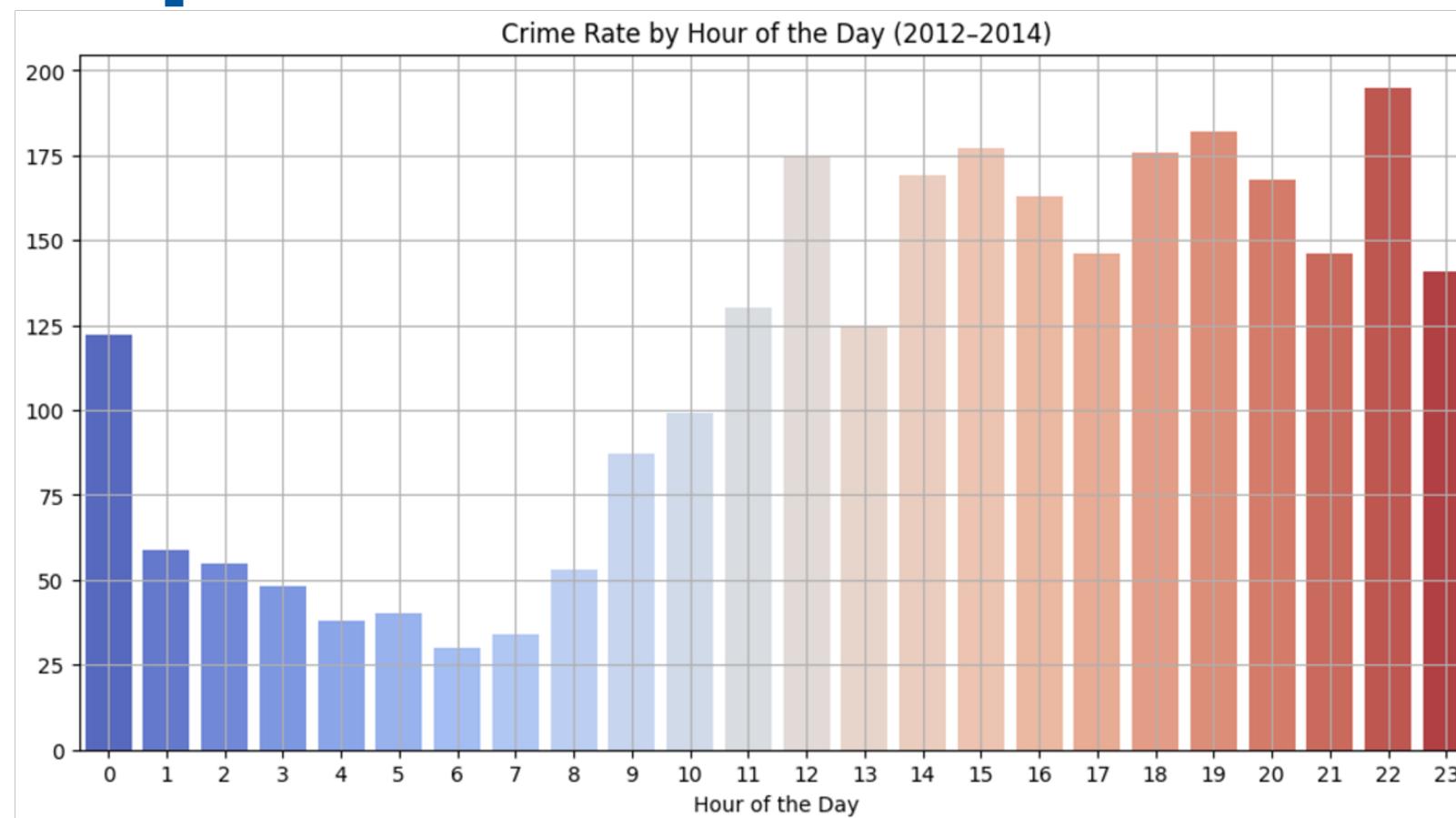
In safe areas like ZIP codes 60618 and 60610, the population is more evenly distributed among White, Latino, and Asian communities, with fewer Black residents.

# Crime

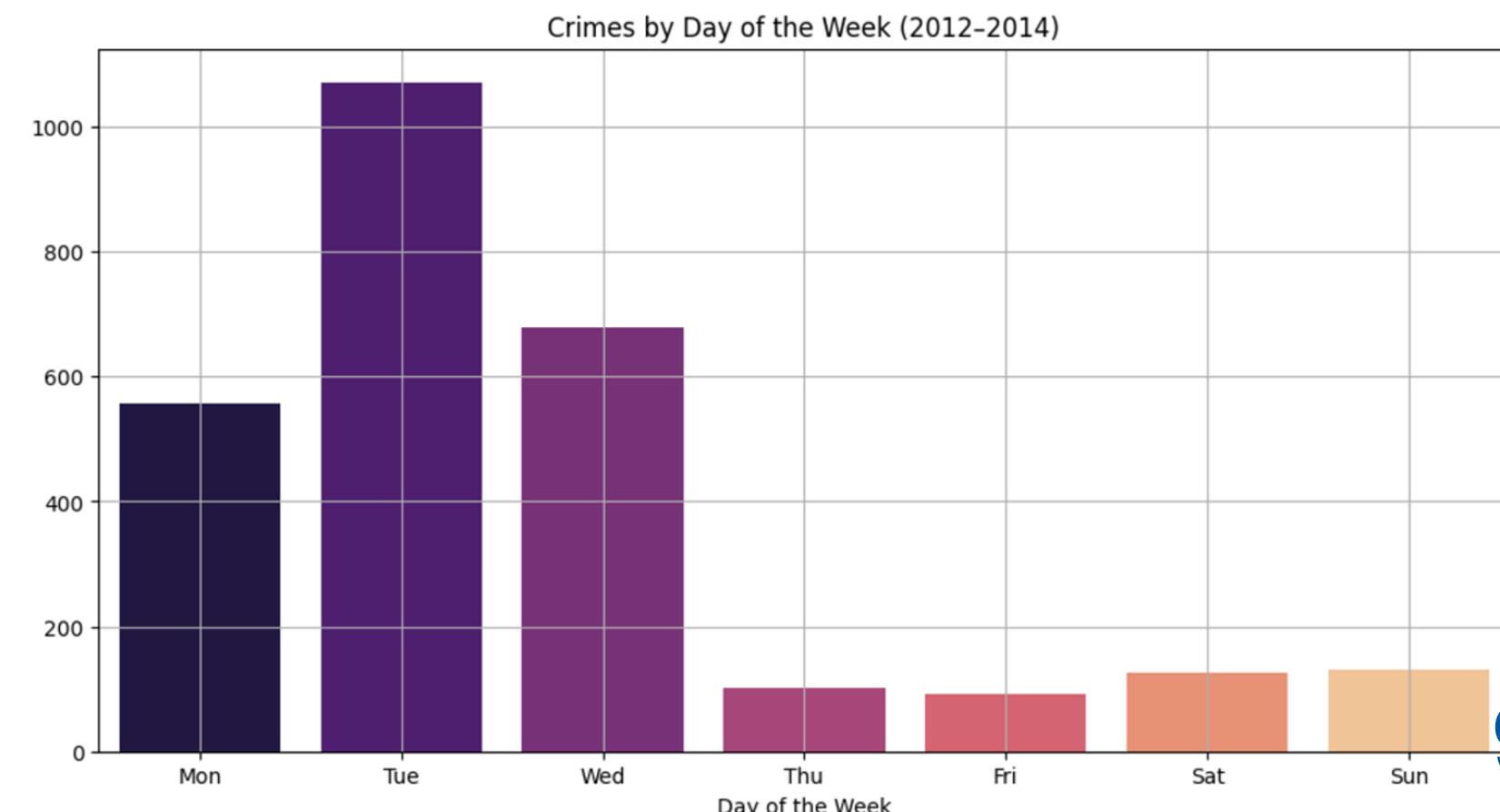
- The bar chart displays the 10 ZIP codes with the highest number of recorded crimes.
  - The map visually represents crime distribution in a geospatial context
    - Higher crime rates are concentrated in the southern and eastern regions.



# Temporal Patterns of Crime: Day and Time Analysis



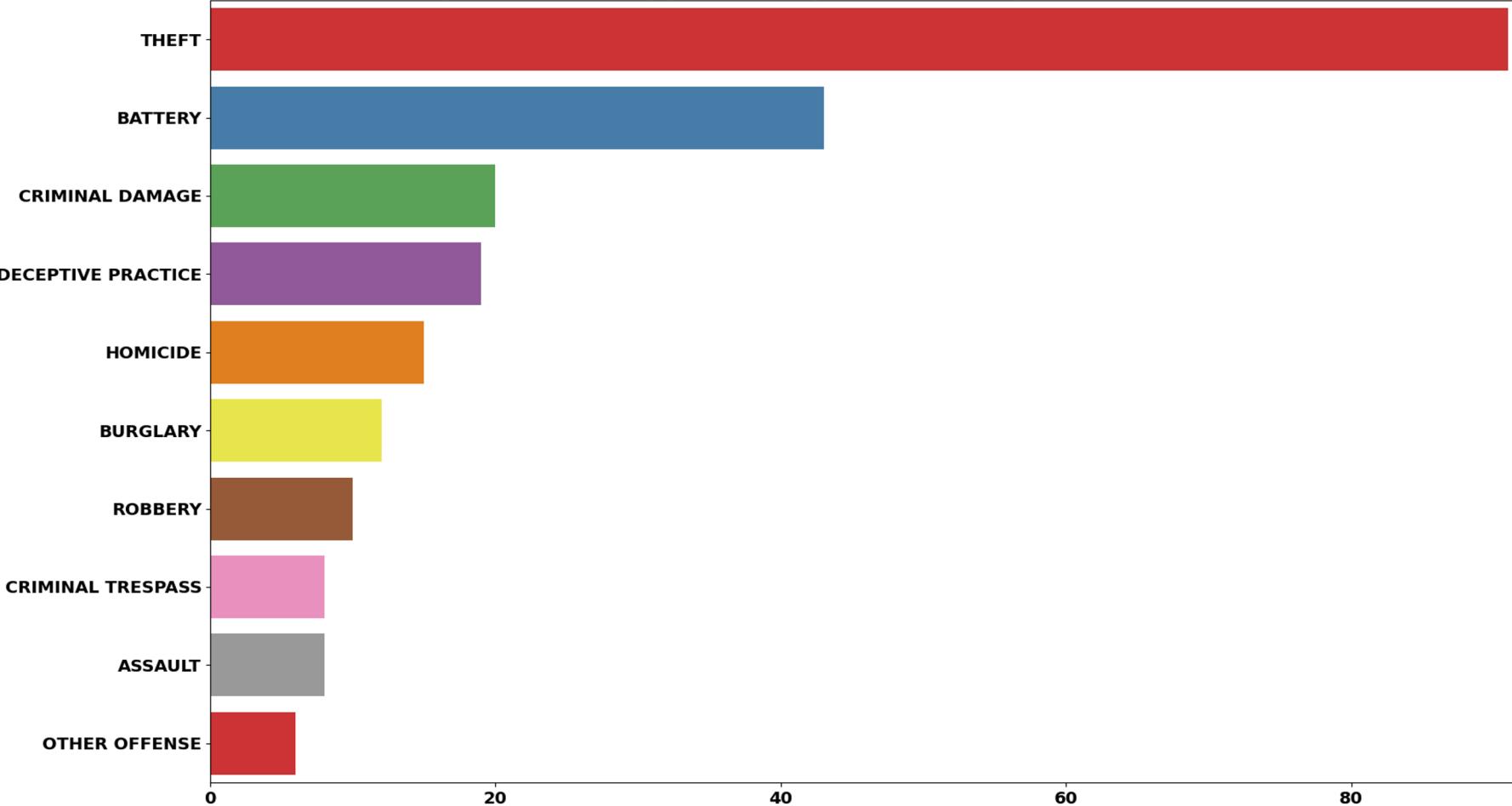
- Crime activity demonstrates a distinct temporal pattern, with significantly **lower rates during early morning hours** (2 AM to 6 AM).
- A gradual increase is observed from 7 AM, **peaking in the late evening** between 7 PM and 10 PM.
- This trend suggests that crimes are more likely to occur during active periods of the day when people are commuting, working, or engaging in social activities.



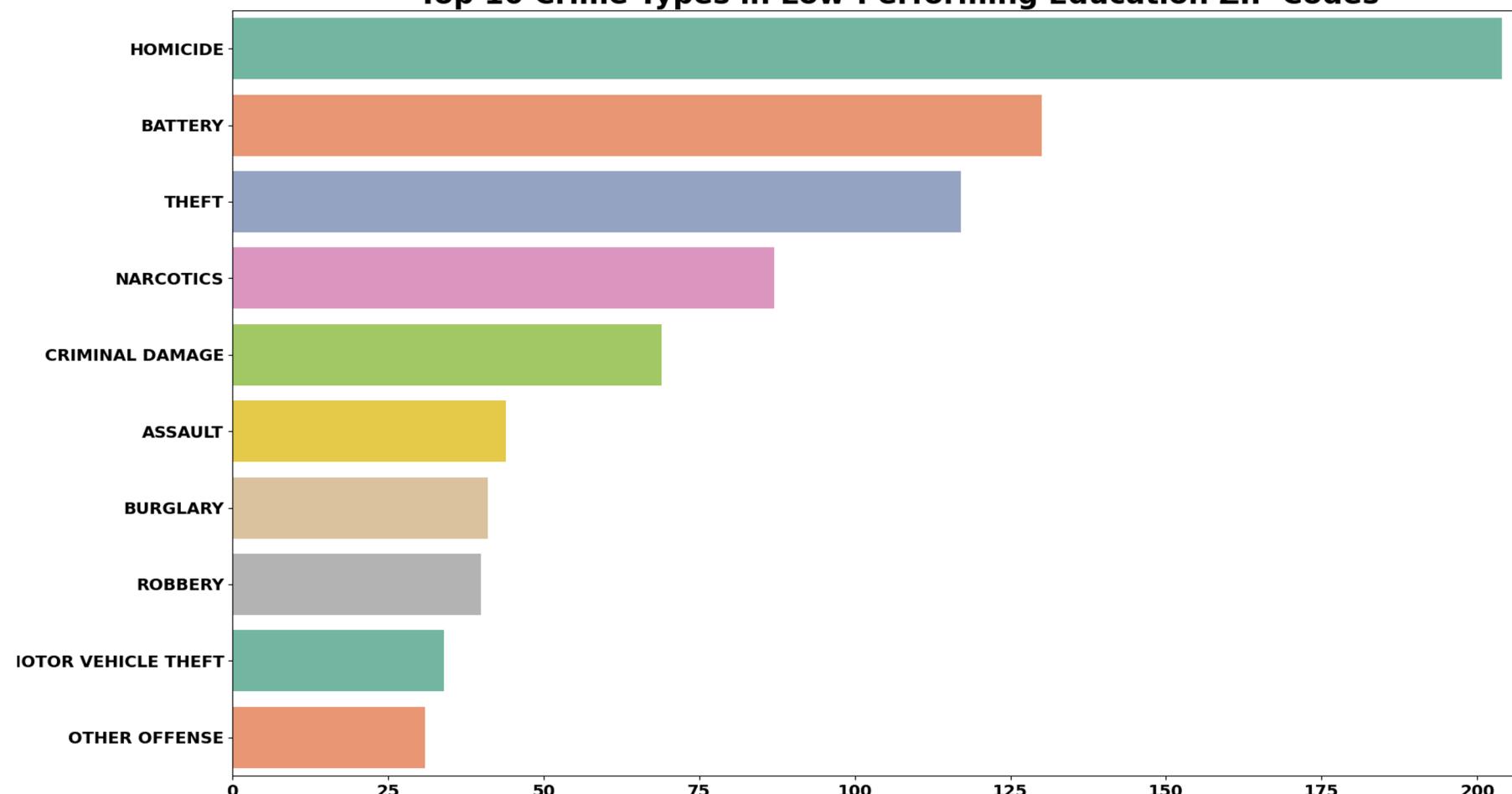
- Weekdays, particularly **Monday and Tuesday, have the highest crime counts**, likely correlating with higher citywide activity during workdays.
- A notable decline in crimes occurs over the weekend, particularly on Saturday and Sunday, when daily routines change, and the city's pace slows down.
- These patterns could reflect changes in population movement, work schedules, and neighborhood activity levels.

# Crime Types in High vs. Low Graduation Rate Areas

Top 10 Crime Types in Top-Performing Education ZIP Codes



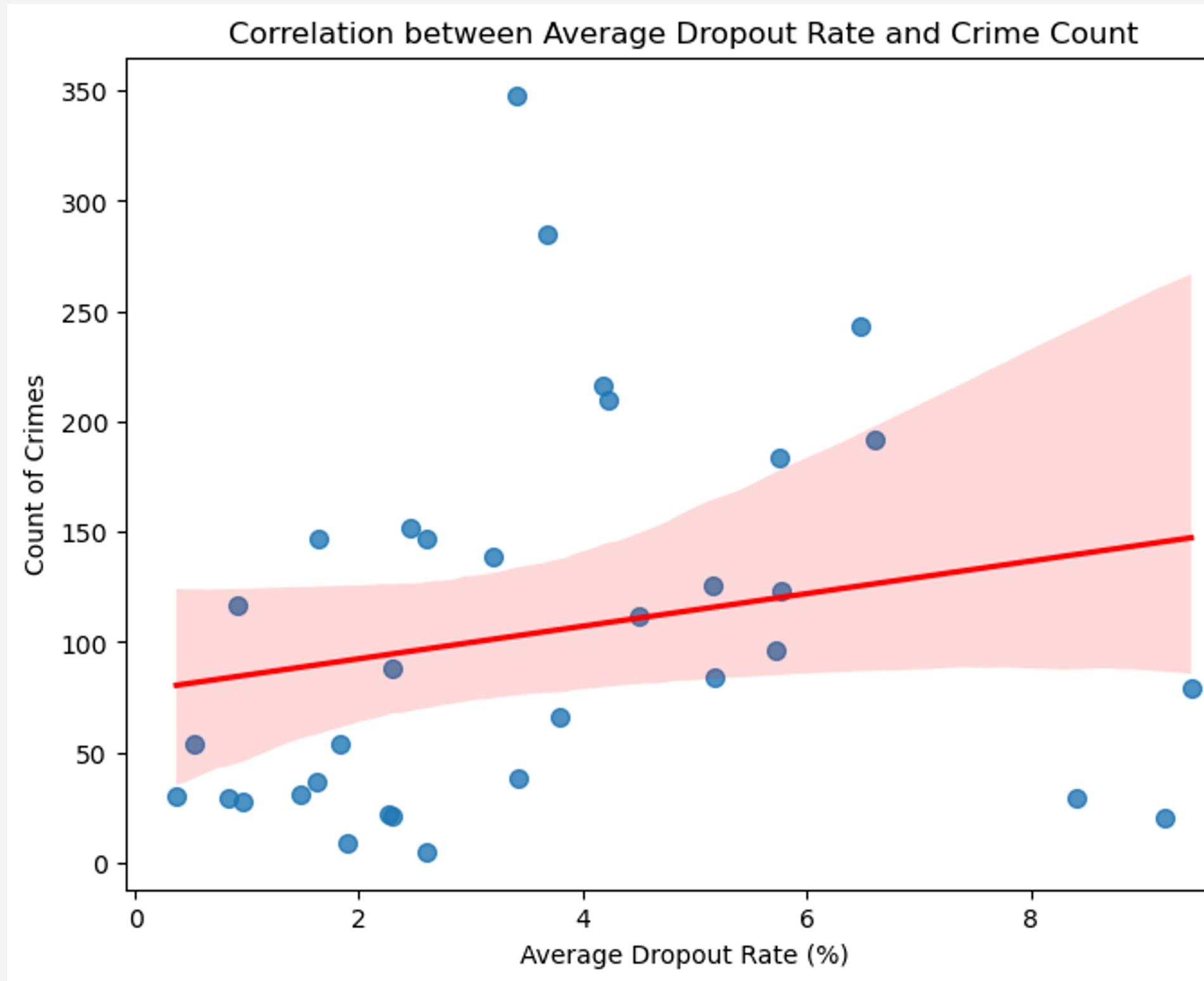
Top 10 Crime Types in Low-Performing Education ZIP Codes



- **Theft and Battery** are the most prevalent crimes in areas with **higher graduation rates**, reflecting urban areas with bustling commercial activity and dense populations.
- The relatively lower incidence of violent crimes suggests a correlation between educational outcomes and reduced levels of severe criminal behavior.

- In contrast, ZIP codes with **lower graduation rates** show a **higher prevalence of Homicides and Narcotics-related offenses**, highlighting systemic issues.
- Crimes such as Battery and Theft remain significant, but the overall distribution indicates a shift towards more violent and drug-related crimes.

# Positive Relationship between Dropout Rate and Crime Count



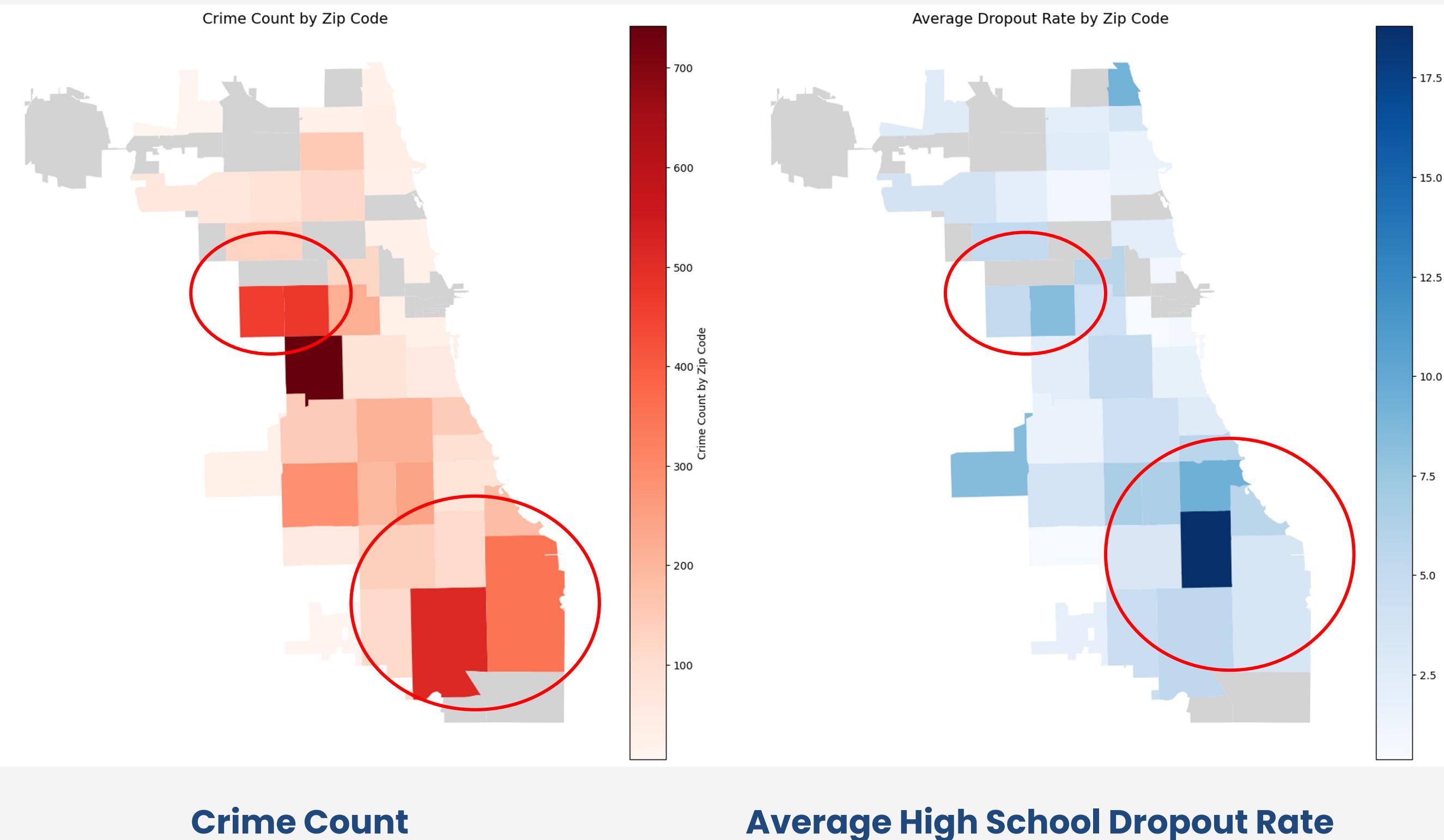
## Correlation Test Result:

- Pearson correlation coefficient:  $\approx 0.21$

## Analysis:

- This showcases a moderately positive relationship between crimes count and high school dropout rates across neighborhood in Chicago.
- As the count of crimes increases, dropout rate is estimated to go up along with it.

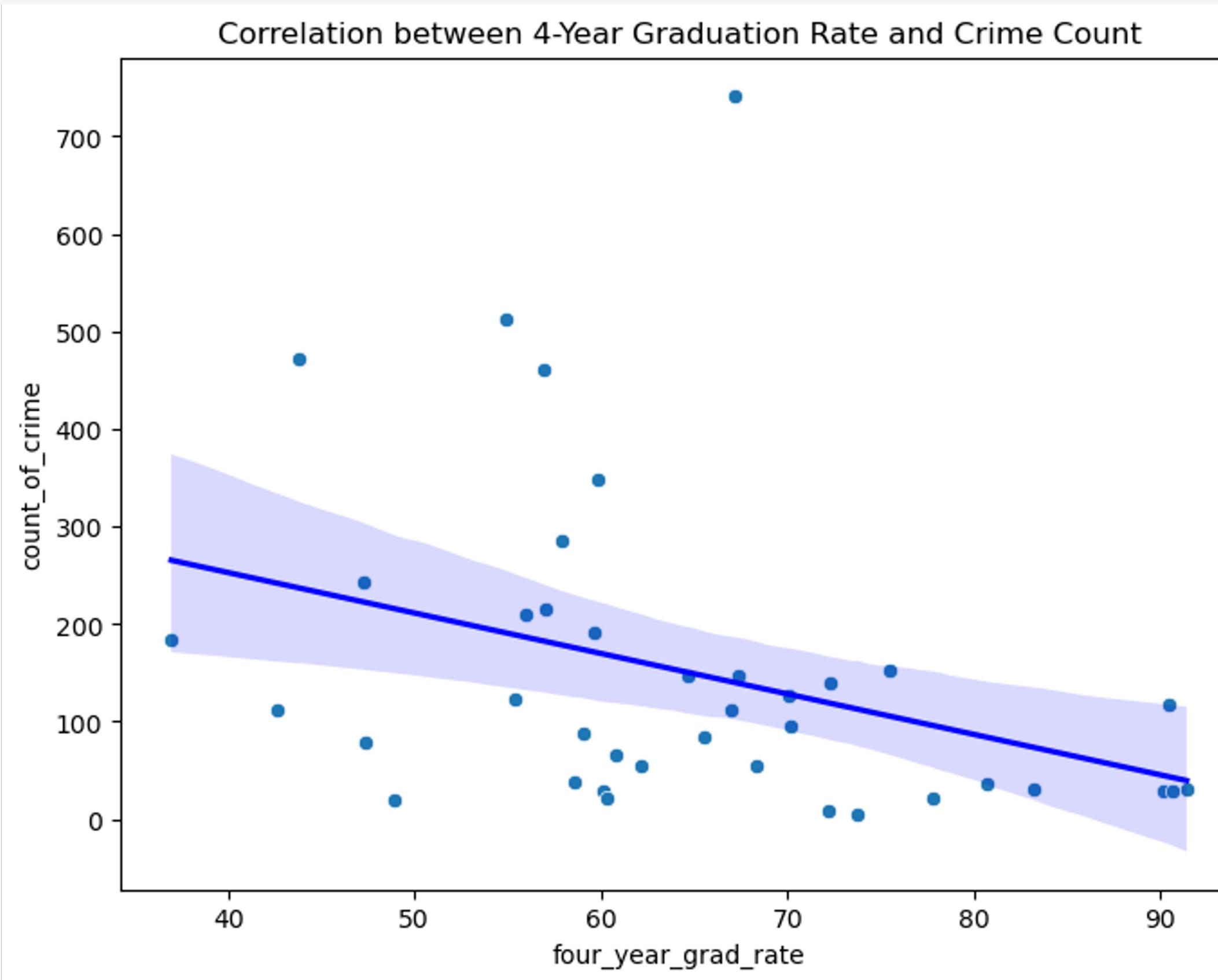
# Density Map: Average Dropout Rate and Crime Count



## Analysis:

- We can see from the map that there is a general association between crime count and average dropout rate across 2012–2014 in Chicago.
- The darker the area (higher crime count) is , the higher dropout rate is in or around that area, reflected by deeper blue color.

# Negative Relationship between Graduation Rate and Crime Count



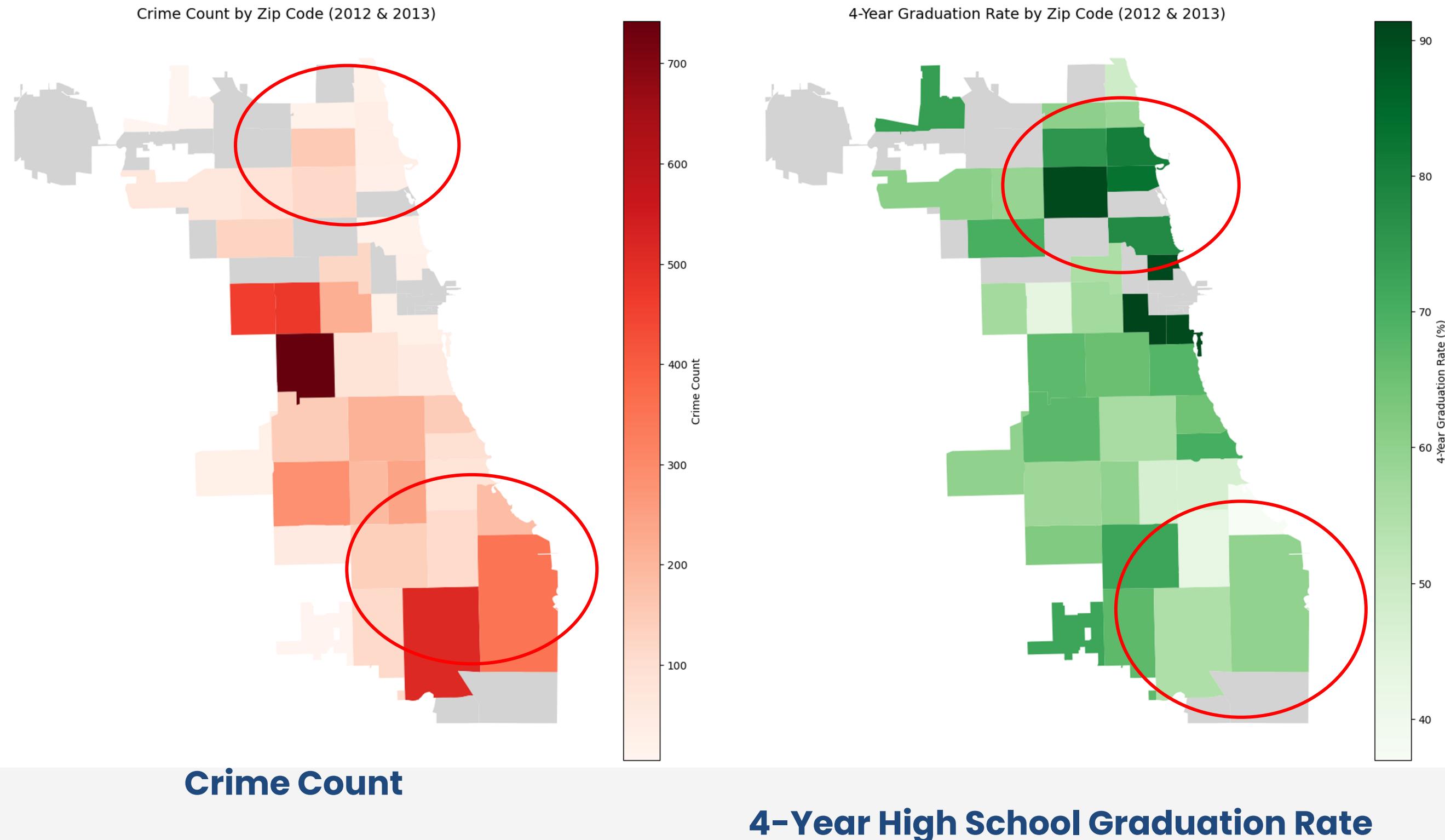
## Correlation Test Result :

- Pearson correlation coefficient:  $\approx -0.35$

# Analysis

- This gives us a negative relationship between crimes count and high school graduation rates across neighborhood.
  - As there are more crimes in the neighborhood, the 4-year graduation rate tend to decrease in response to the crime.

# Density Map: Four-Year Graduation Rate and Crime Count



## Analysis:

- This map reinforces the negative correlation between crime counts and high school graduation rates in Chicago.
- It can be observed that the place with higher graduation rate (darker green on the right) generally associates with less crime count (lighter red on the left).

# Recommendations

## Enhance Collaboration Between Education and Law Enforcement

- Implement Programs that foster partnerships between schools and police to address community-specific challenges
- Develop early intervention initiatives for at-risk youth

## Address Root Cause of Crime

- Increase funding for mental health services and vocational training
- Develop programs to tackle socio-economic disparities in vulnerable communities

## Strengthen Community-Based Educational Programs

- Expand after-school and mentorship programs in neighborhoods with high crime rates
- Partner with community leaders to improve trust and participate in these initiatives

## Increase Public Awareness and Engagement

- Launch public campaigns to raise awareness about the relationship between education and crime
- Engage local communities in discussions on the importance of education in crime prevention

A photograph of the Chicago skyline at sunset, featuring the Willis Tower (formerly Sears Tower) and other skyscrapers reflected in the water of the Chicago River.

# CONCLUSION

## Key Takeaways

- General correlation between crime and education outcomes – high crimes are expected to result in high school dropout rates and low graduation rates.
- Education plays a crucial role in reducing crime by addressing underlying socio-economic factors.
- Collaboration between schools, law enforcement, and community stakeholders is vital for creating long-term impact.
- Data-driven approaches enable targeted interventions and more efficient resource allocation.

## Next Steps

A photograph of the Chicago skyline at night, showing the city lit up with numerous skyscrapers and lights.A photograph of the Chicago skyline during the day, showing the buildings and the Chicago River in the foreground.

- Implement recommendations to foster safer and more educated communities.
- Monitor progress through regular data analysis and community feedback.
- Scale successful initiatives to other areas facing similar challenges.

## Final Thought

By combining the power of education, community engagement, and law enforcement, we can work toward creating a safer Chicago for all.