December 25, 2025

NYC Safety Analysis
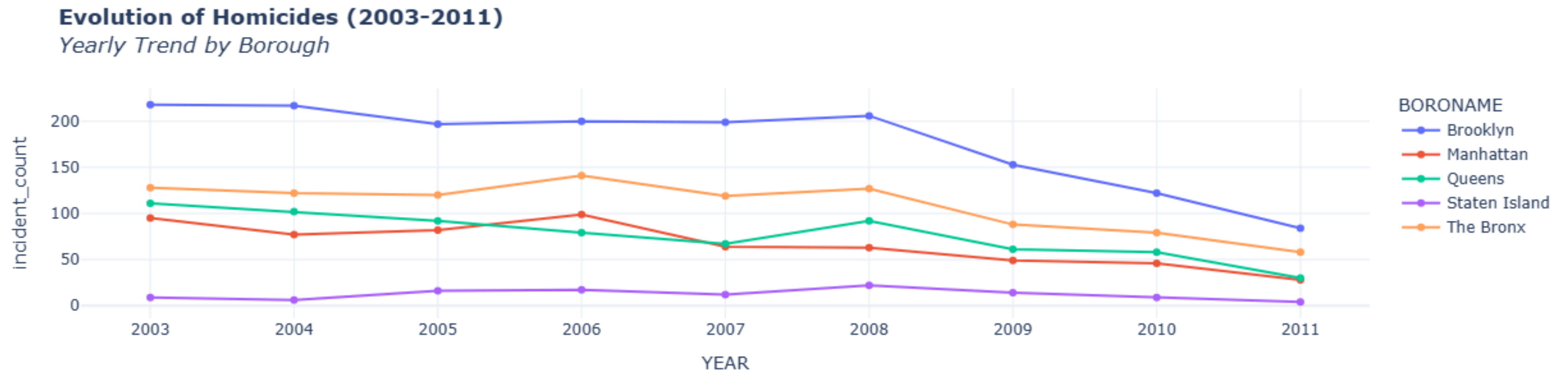
NYC Safety Analytics: A Spatiotemporal Investigation

Project Objective

Analyzing NYC Homicide Patterns and Trends

This project aims to analyze years of homicide logs to uncover **key trends**, spatial hotspots, and factors influencing incidents across New York City, enhancing public safety strategies.

Evolution of Homicides (2003-2011)
Yearly Trend by Borough

BORONAME
- Brooklyn
- Manhattan
- Queens
- Staten Island
- The Bronx

Methodology

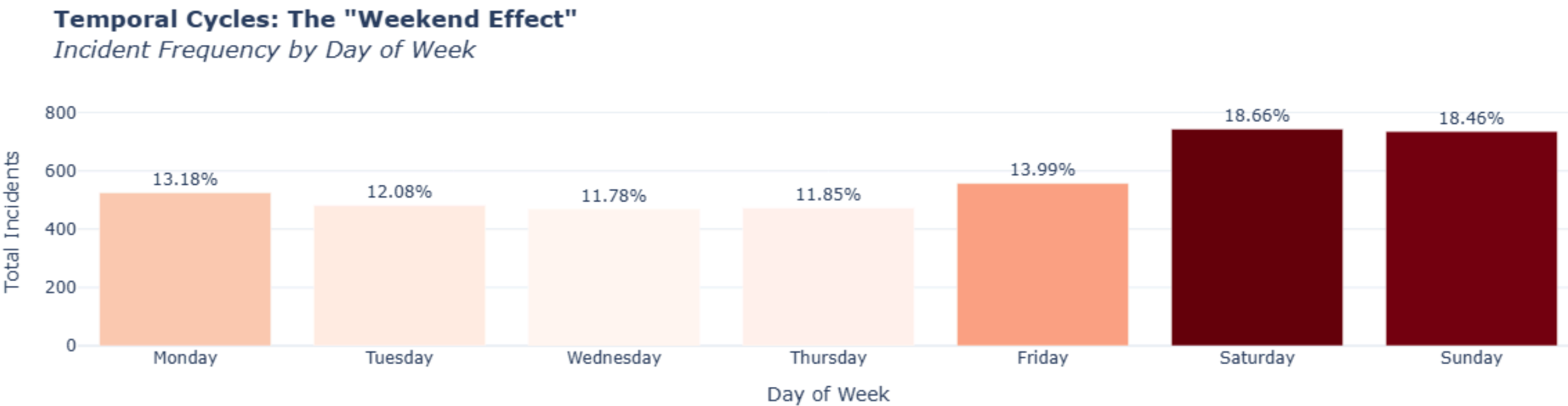**Tools and Technologies for Analysis**

We utilized **Python** for data processing, **SQL** for querying, and **PostGIS** for spatial handling, ensuring an efficient workflow from data ingestion to temporal aggregation.

Temporal Analysis: The Weekend Effect
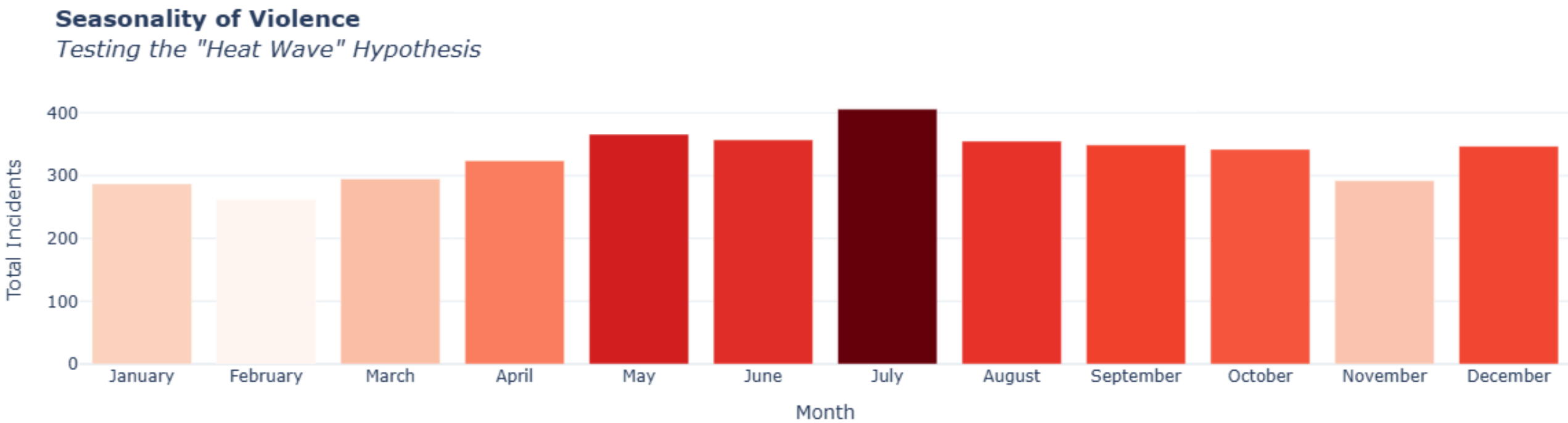
Weekend Effect

Homicide incidents significantly **spike on Saturdays**, indicating a need for targeted policing strategies during weekends to enhance public safety and reduce crime rates.

Temporal Cycles: The "Weekend Effect"
Incident Frequency by Day of Week

Total Incidents — Day of Week

Monday: 13.18%
Tuesday: 12.08%
Wednesday: 11.78%
Thursday: 11.85%
Friday: 13.99%
Saturday: 18.66%
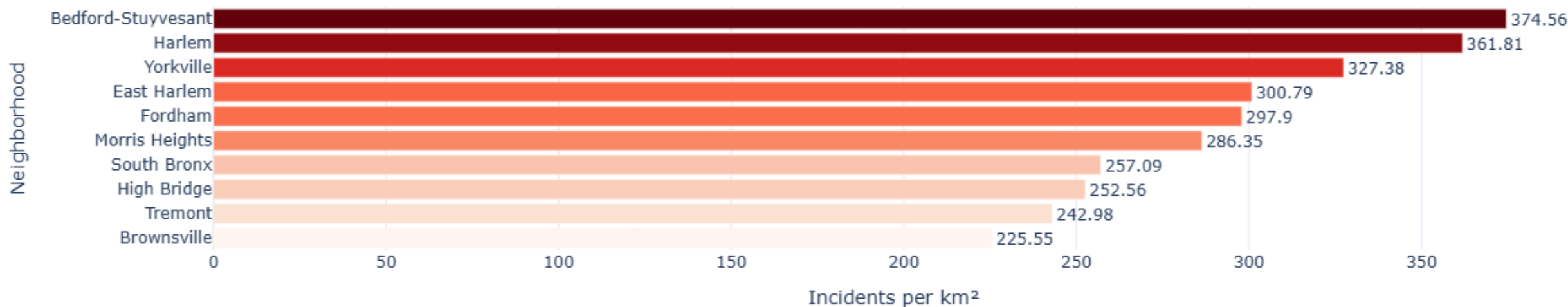Sunday: 18.46%

Temporal Analysis: The Heat Hypothesis

Heat Hypothesis

Crime follows the thermometer. We observe a consistent surge in incidents during July and August, suggesting environmental stressors drive violence

Seasonality of Violence
Testing the "Heat Wave" Hypothesis

Spatial Analysis: The Density Paradox

The Density Paradox: Top 10 Most Dangerous Zones
Incidents per Square Kilometer

Neighborhood	Incidents per km²
Bedford-Stuyvesant	374.56
Harlem	361.81
Yorkville	327.38
East Harlem	300.79
Fordham	297.9
Morris Heights	286.35
South Bronx	257.09
High Bridge	252.56
Tremont	242.98
Brownsville	225.55

Density Paradox

The Misconception: We usually measure danger by "Total Incidents" (Volume).

The Reality: When we divide by land area, small neighborhoods like Yorkville reveal a much higher "Danger Density" than larger zones.
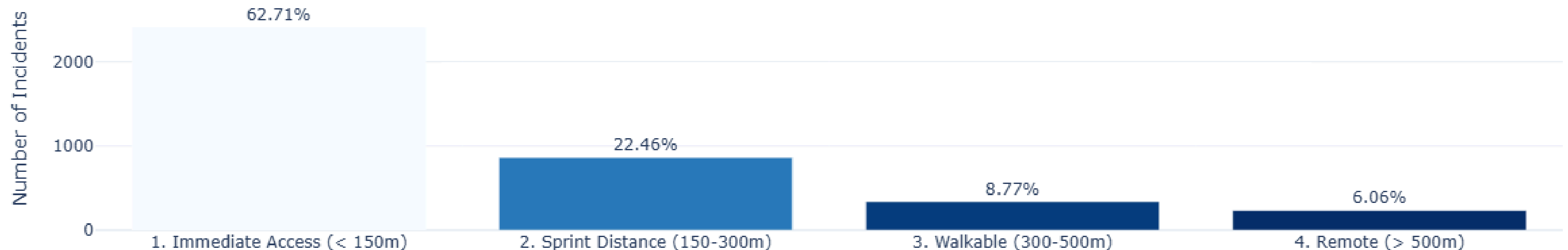
The Paradox: A neighborhood can have fewer crimes but be more dangerous to walk through because the violence is hyper-concentrated

Subway Proximity

Proximity to subway stations correlates with homicide occurrences, highlighting transit hubs as **risk factors** for safety.
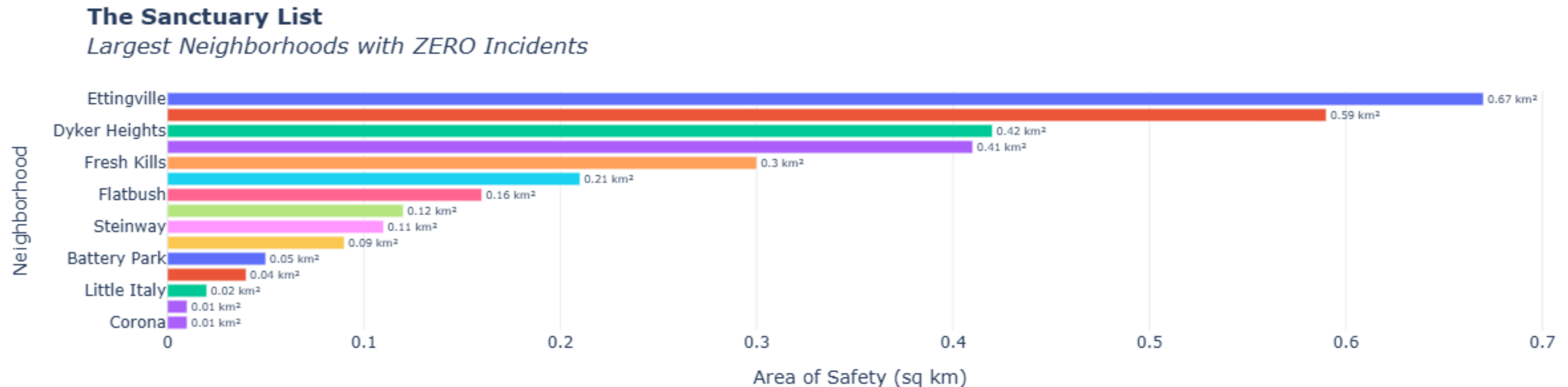
The "Getaway" Hypothesis
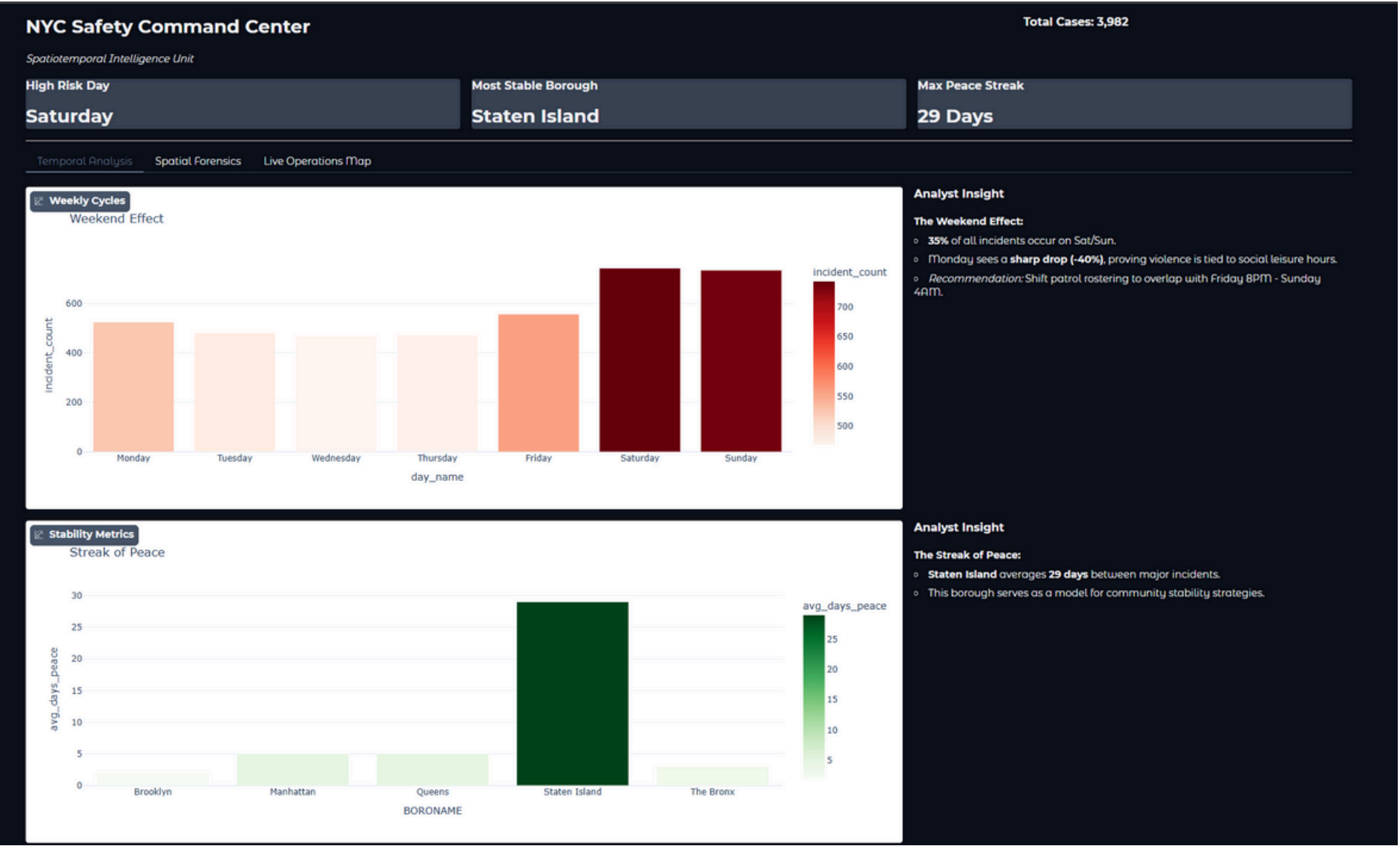*Homicide Proximity to Subway Stations*

Sanctuary Zones

The analysis identified several neighborhoods with remarkably low homicide rates, known as **sanctuary zones**, suggesting effective community safety measures.

The Sanctuary List
Largest Neighborhoods with ZERO Incidents

Neighborhood	Area of Safety (sq km)
Ettingville	0.67 km²
Dyker Heights	0.59 km²
Fresh Kills	0.42 km²
Flatbush	0.41 km²
Steinway	0.3 km²
Battery Park	0.21 km²
Little Italy	0.16 km²
Corona	0.12 km²

Dashboard Demo

This interactive analytics platform enables stakeholders to explore homicide patterns through dynamic filters and visualizations effectively.
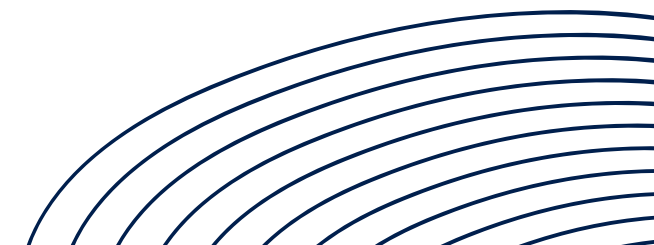
Staffing Recommendations

- Implement "**Weekend Surge**" Rosters
  - 35% of incidents (Sat/Sun)
- Launch a "**Summer Task Force**" in June
  - 400+ incidents in July

Infrastructure Recommendations

- Secure the "**300-Meter Sprint Zone**"
  - 60% of incidents occur near subways
- Replicate the "**Staten Island**" Model
  - Benchmark: 29-day peace streaks

Thank You