

Emergency Calls in New York City

Disparate Need and Implications for Emergency Service Provision



Motivation

- City governments often struggle to provide for large and diverse populations with the services they need
- With heterogeneity, how are cities able to provide equally-beneficial services to residents?
- Enable economic mobility and community safety

Background



Research Question

How are emergency calls distributed across New York City? What underlying population characteristics may explain some of this distribution?



<https://digimarconeast.com/new-york-city-boroughs/>

Data On Emergency Response Incidents

Data includes:

- incident type
- location (address) of the incident
- borough, date of record creation
- date of incident closure
- the specific latitude/longitude of the incident's location

Data On Emergency Response Incidents

Additional Data from the 2017 American Community Survey

- population characteristics in each borough.
- median household income,
- overall population count
- race and ethnicity for each borough

Test Hypotheses

Null Hypothesis:

- Incident frequency (measured by calls), is equal across boroughs with respect to the relative proportion of population that resides in each borough
 - The number of calls in each borough will be the same proportion of the overall calls as that borough's populations' proportion of New York City's total population

Alternative Hypothesis:

- Incident (call) distribution is not distributed proportionally compared to the relative populations of each borough

Methodology

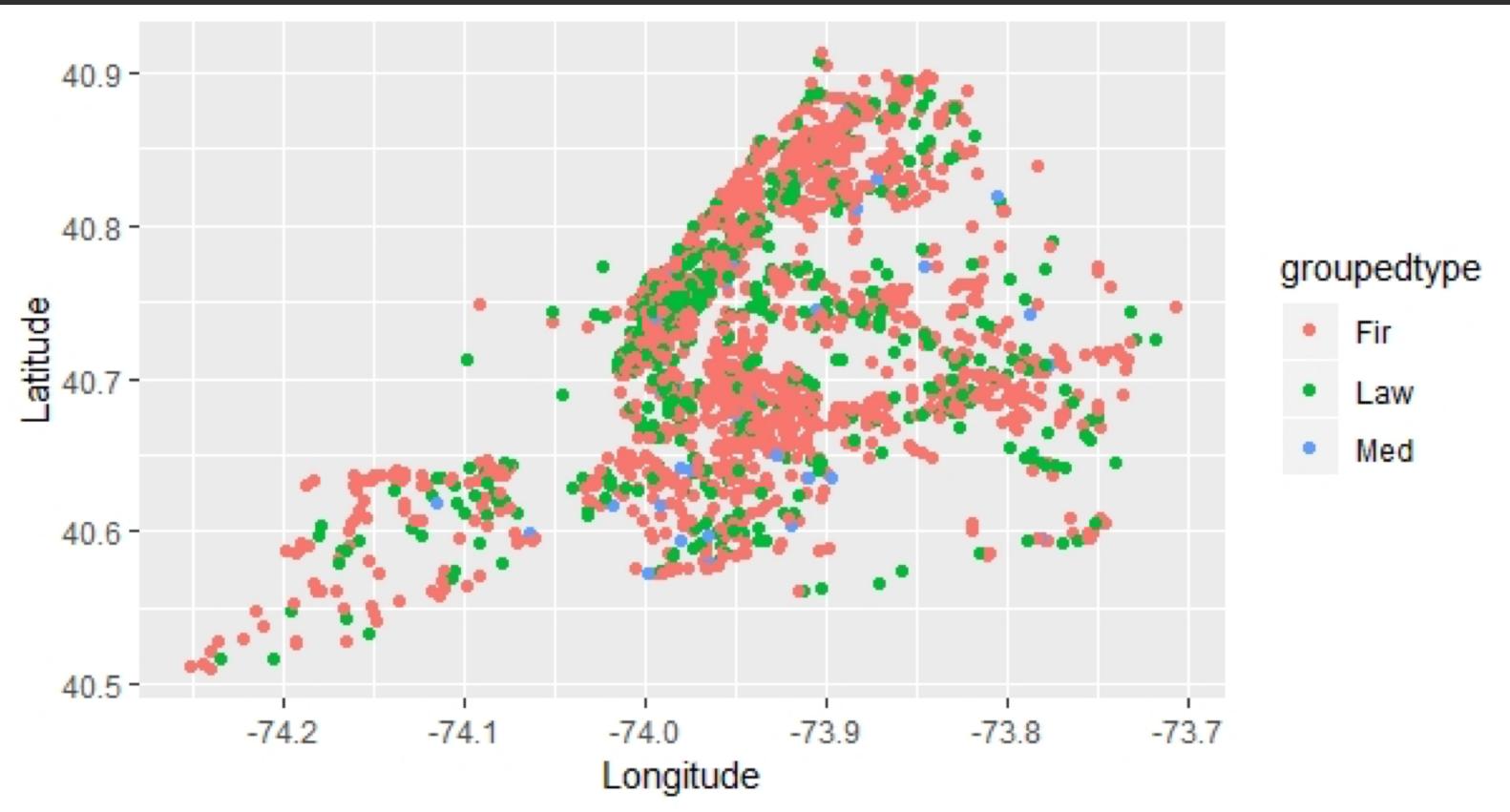
- Chi-square test
 - Measure the observed proportion of calls from each borough compared to the expected proportion of calls based on the relative population in the borough
- Calculation of standardized residuals for each borough
 - Evaluate biggest contributors to the chi-square statistic from the expected vs. observed proportion totals

Results

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Pearson's Chi-squared test
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data: contingencyTable  
X-squared = 231.18, df = 4, p-value < 2.2e-16
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- Reject null hypothesis
- Biggest residuals/contributors:
 - Manhattan (residual of 19.44; 503 more calls than expected)
 - Queens (residual of -11.36; 354 fewer calls than expected)
 - Brooklyn, Bronx, Staten Island — all fewer calls than expected



Conclusions & Other Considerations

- Why is there such a drastic difference between population and incident frequencies across boroughs?
- What other factors could be contributing to these results?
 - Is population the most effective measurement of where people spend their time?

→ Example usage: How NYC distributes its social services

Works Cited

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