Seasonal Flu in NYC:
A Social Vulnerability Index

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BACKGROUND

- ~ 2,000 NYC residents die annually from seasonal influenza (flu)
- In 2014, more than
  - homicides (328)
  - HIV/AIDS related deaths (1,473)
- No existing outreach program

GOAL: Reduce seasonal flu deaths using targeted prevention efforts

SOCIAL VULNERABILITY

"The lack of resilience of a community to natural disasters and anthropogenic events"

Social Vulnerability Index (SVI):

- Socio-economic factors

- Census tract level

- Planning and recovery efforts

NYC Seasonal Flu SVI

- Population density

- Employment density

- Age – under 18, over 65

- No insurance

- Poverty rate

- Median income
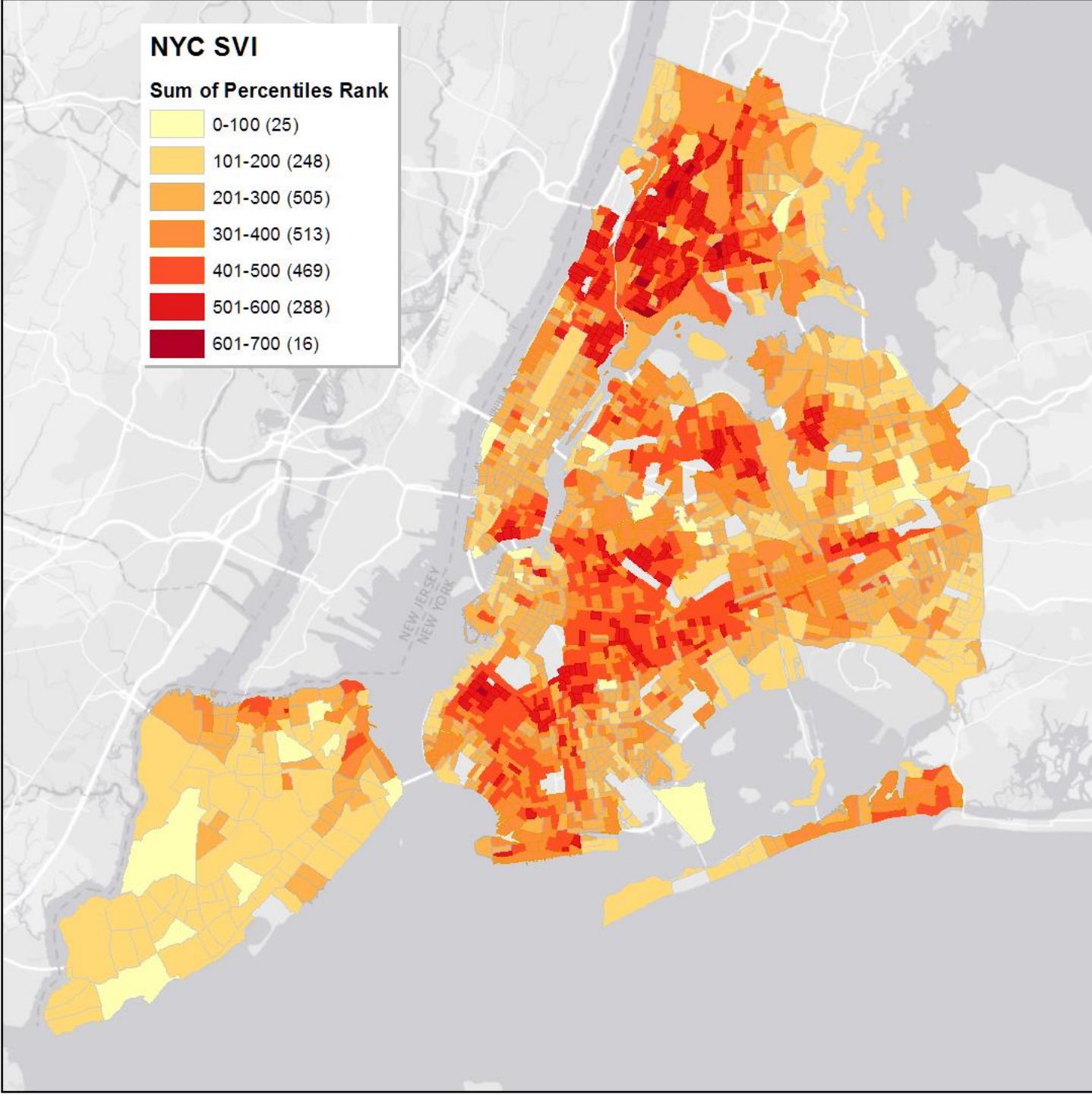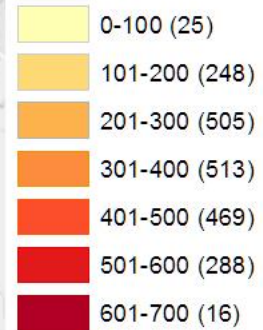
- Public transportation commute

$$\text{Index} = \sum_{i=1}^{N}(V_1 + V_2 + \cdots + Vj)$$

KEY FINDINGS

- Most vulnerable populations
  - Bronx
  - Brooklyn
- Most vulnerable census tracts found in four boroughs
- Spatial correlation exists
- Vaccination locations not evenly distributed

# NYC Seasonal Flu Social Vulnerability Index

- 44% of residents live in areas with medium to high vulnerability (400-700)

- 50% of Bronx residents live in highly vulnerable (500-700) areas
  - 18% Brooklyn & Manhattan
  - Less than 1% of Staten Island

- More than 80,000 residents live in the highest category of vulnerability (600-700)

NYC SVI

Number of variables above 75th percentile

- 0 (668)
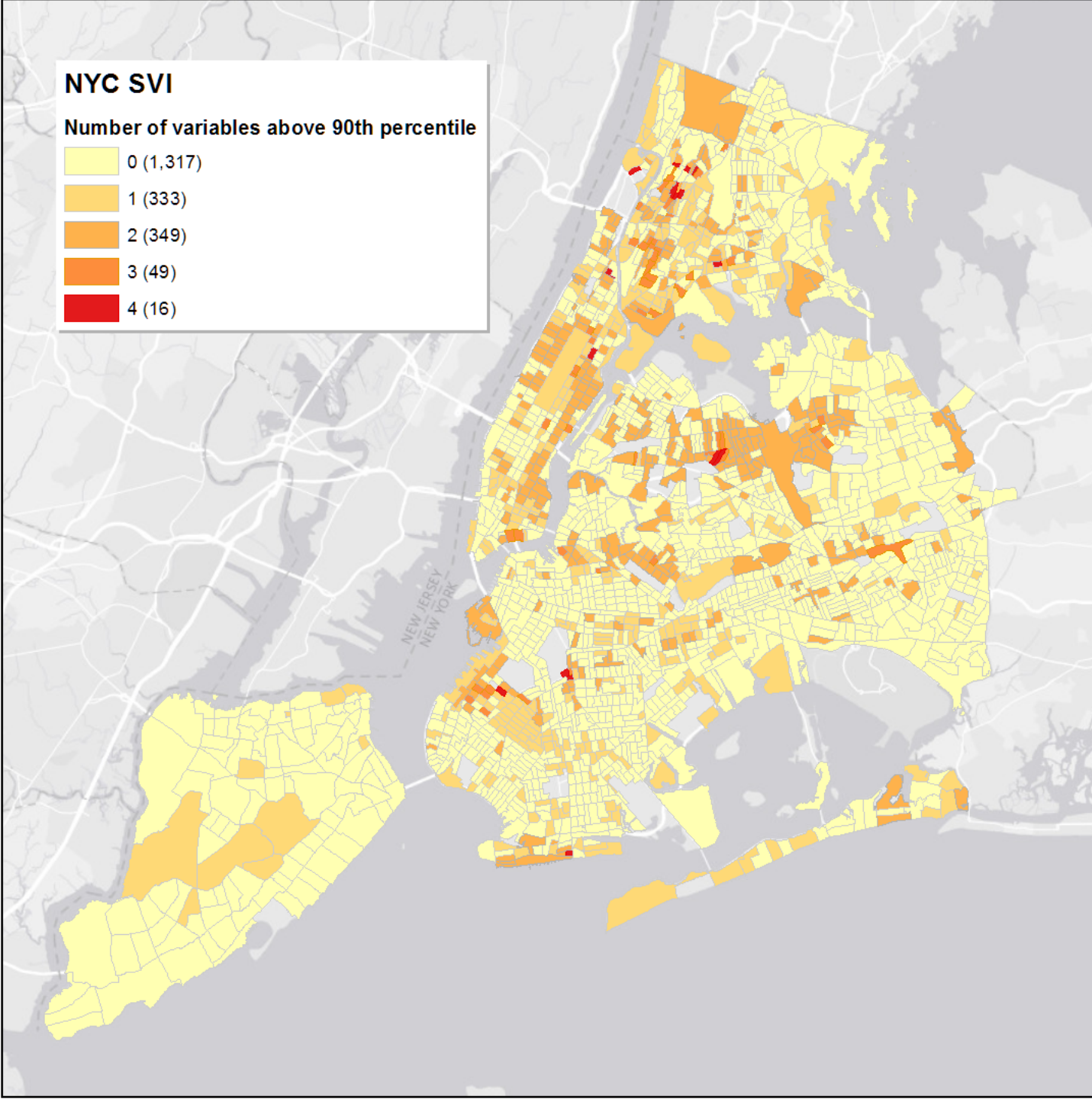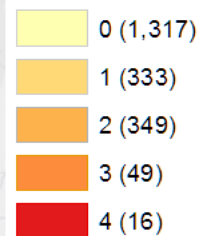- 1 (439)
- 2 (528)
- 3 (200)
- 4 (150)
- 5 (67)
- 6 (12)
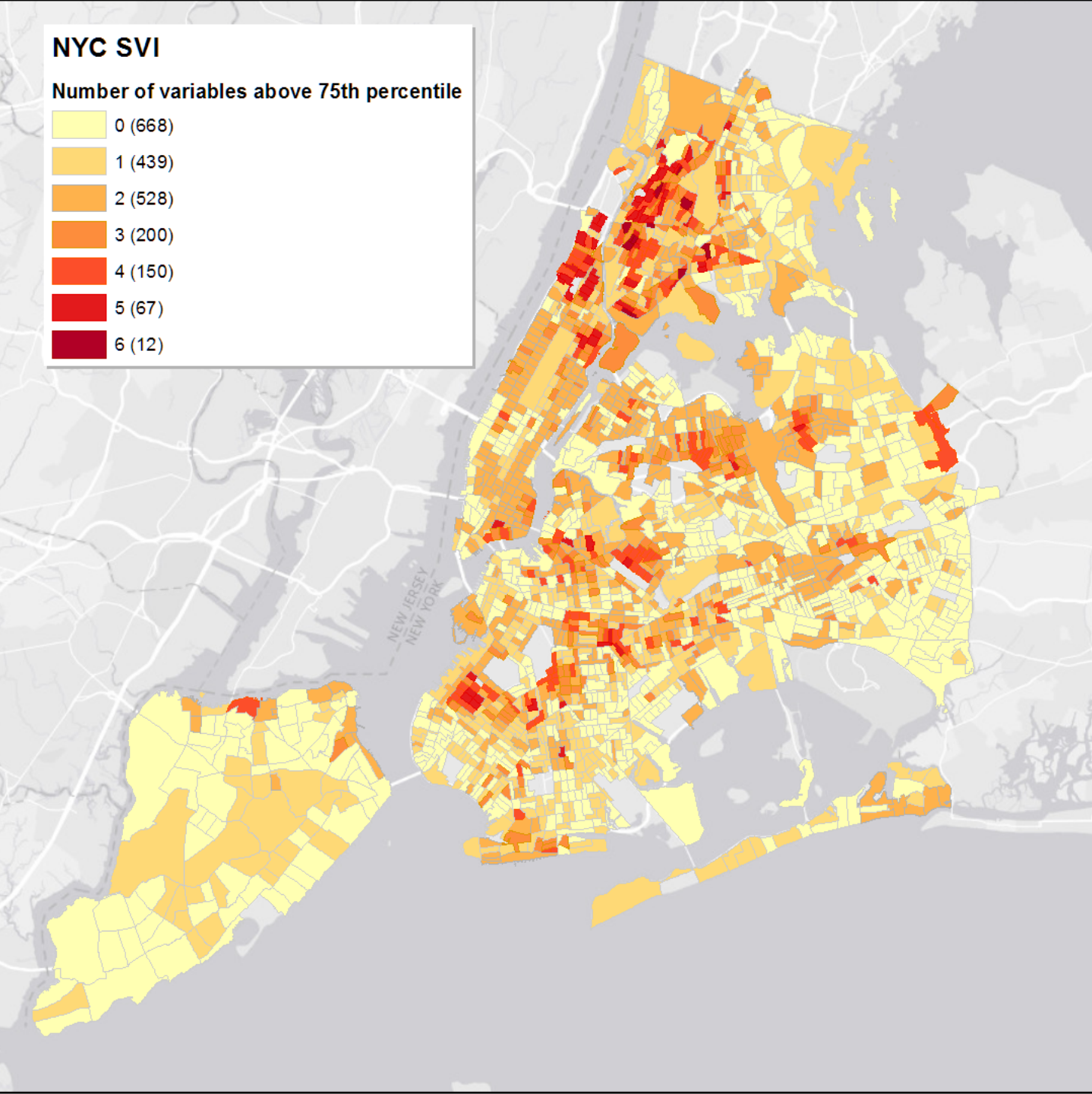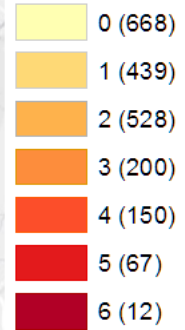
75th Percentile "Flags"

- Indicates variables over the 75th percentile

- 12 census tracts with 6 flags
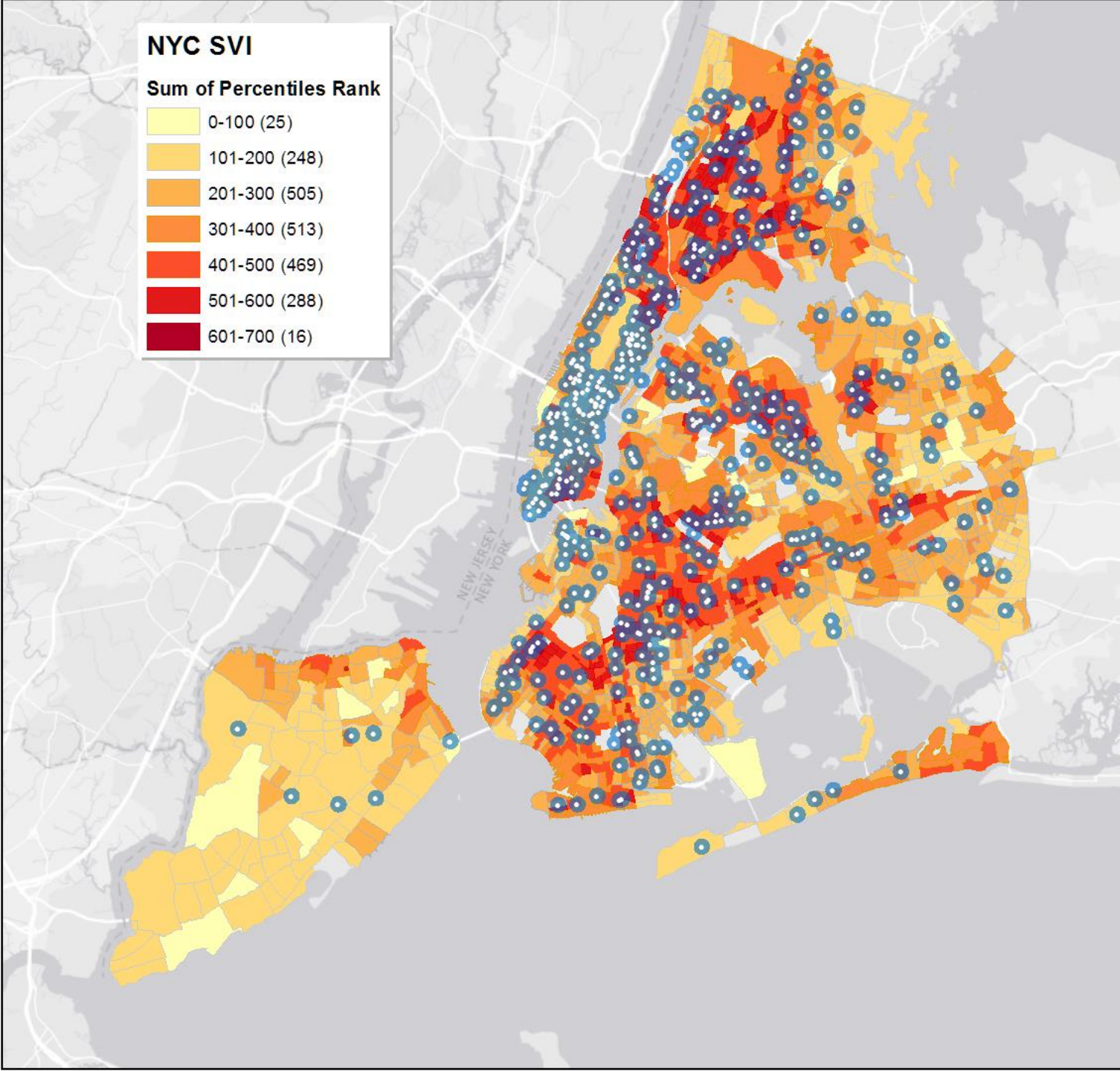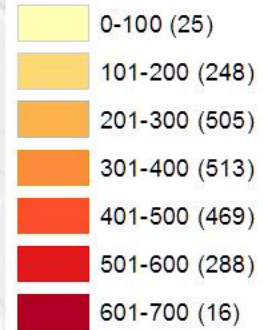 - South & West Bronx
  - ~66,000 residents (4.7%)

90th Percentile "Flags"

- Indicates variables over the 90th percentile

- 16 census tracts with 4 flags
  - ~90,000 residents (5.3%)

NYC SVI
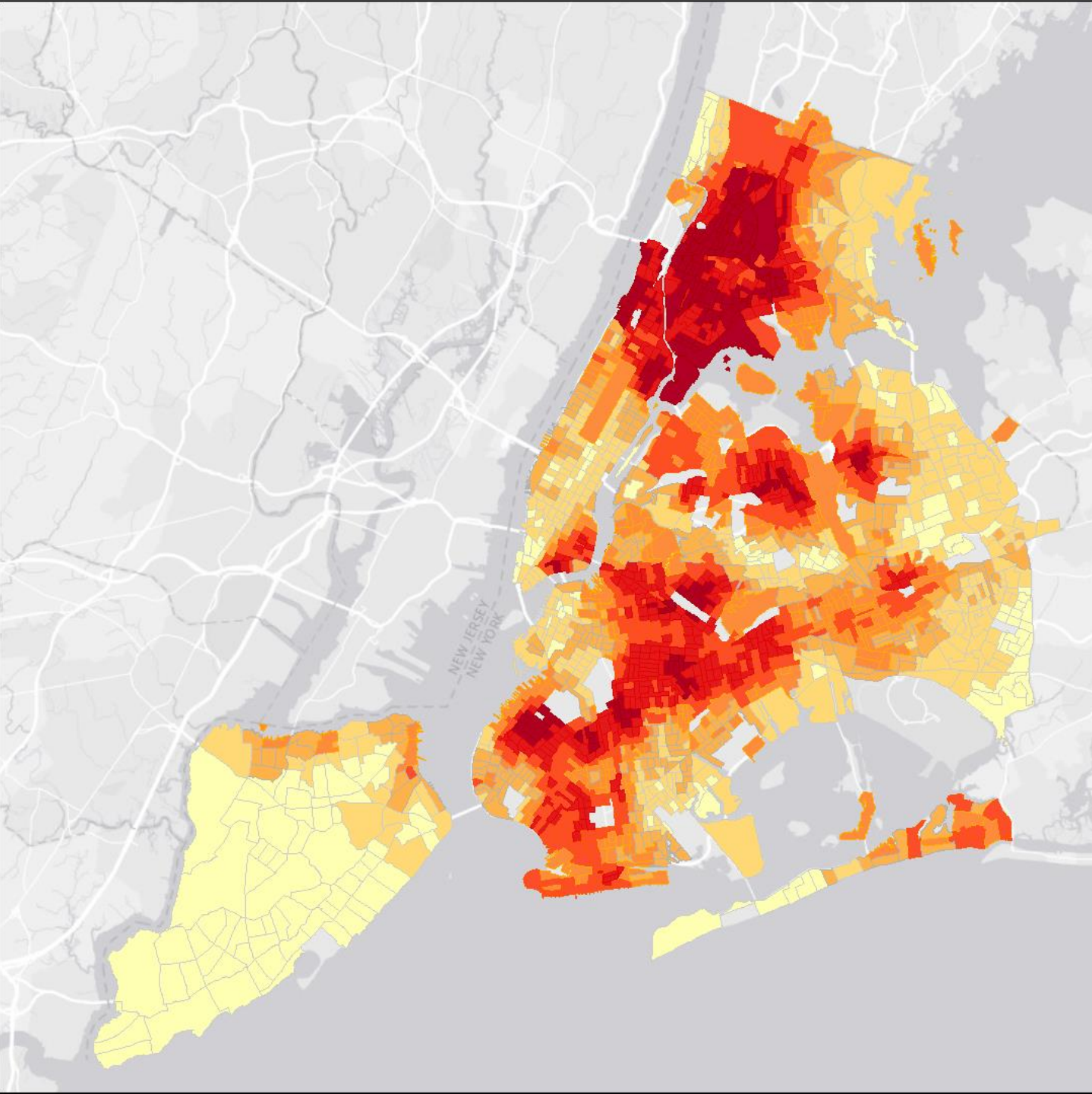
Number of variables above 90th percentile

- 0 (1,317)
- 1 (333)
- 2 (349)
- 3 (49)
- 4 (16)

Vaccination Locations

- 40% of NYC residents are within .25 mile of a vaccination location

- 78% of Manhattan population

- 2% of Staten Island

- Almost 50% of Brooklyn is not within .25 mile of vaccination location

NYC SVI

Sum of Percentiles Rank

- 0-100 (25)
- 101-200 (248)
- 201-300 (505)
- 301-400 (513)
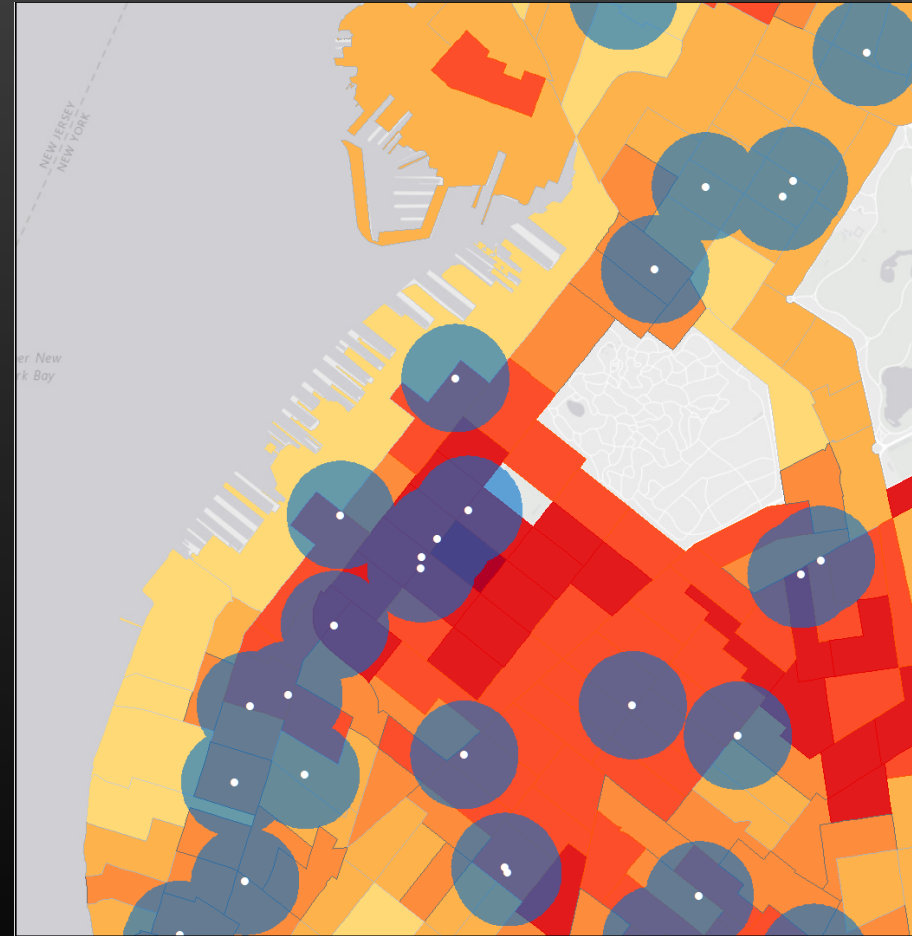- 401-500 (469)
- 501-600 (288)
- 601-700 (16)

Spatial Autocorrelation

- Creates neighborhood-like boundaries

- Indicates areas with similar characteristics

Case Study: Sunset Park, Brooklyn

Community Profile

- 24.5% under 18

- 23.7% in households with less than $20,000 annually

- 22% with health insurance

- 62.7% commute using public transportation

Case Study: Sunset Park, Brooklyn

Targeted Outreach

- Utilize schools for information distribution
- Offer free vaccinations
- Increase the number of vaccination locations
- Post awareness information in MTA stations

Community Profile

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- 23.7% in households with less than $20,000 annually
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Opportunities

- Leverage medical records to enhance accuracy of the index
  - Hospital discharge
  - Insurance claim

- Incorporate additional variables
  - Relative effectiveness of flu shots on certain demographics
  - Vaccination rates

Conclusions

- A Social Vulnerability Index can be used to indicate communities that need additional resources

- Targeted outreach strategy could reduce seasonal flu rates

- Addition of illness and death rates would improve the Seasonal Flu SVI index scores