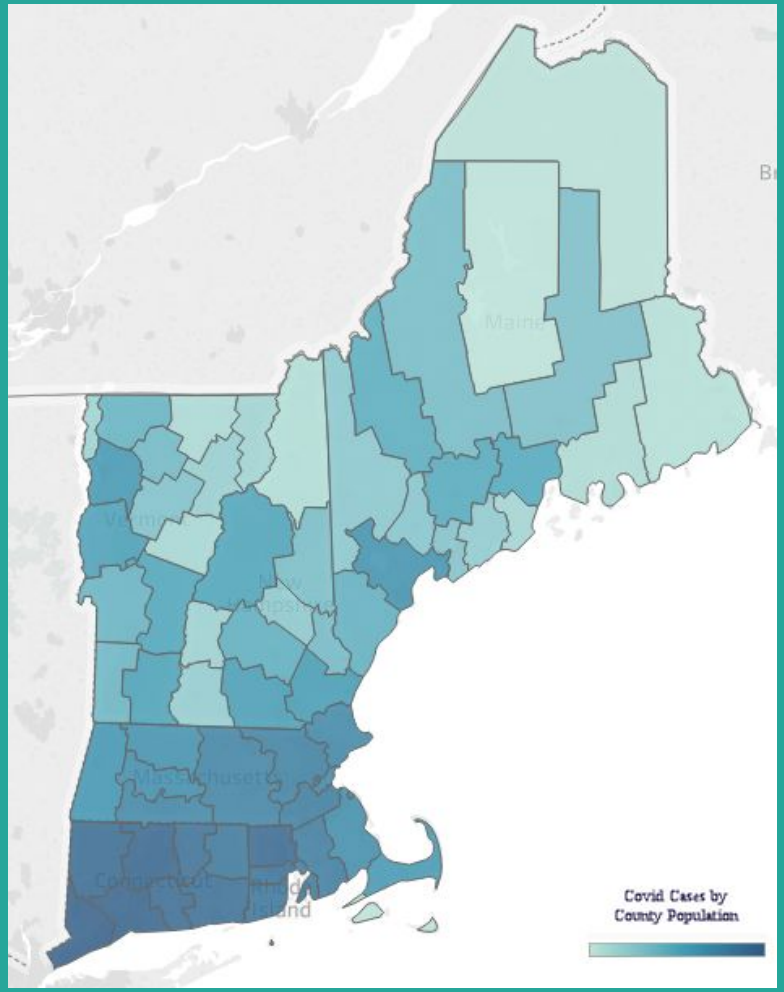

Reopening of super spreader businesses and risk of COVID-19 transmission

MIT COVID-19 Datathon

Track D, Team 6

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Research Question

Objective: Develop a data-driven policy for reopening businesses.

Aim 1: Classify businesses into super-spreaders and not super-spreaders based on frequency and duration of visits pre-pandemic.

Aim 2: Identify association between counties with higher density of super-spreaders and COVID-19 cases.

Data Sources and Population

Data Sources

SafeGraph Business Visitation Patterns

Johns Hopkins University Covid-19 Data

New York Times' COVID Resources

American Community Survey

North American Industry Classification System

Population

Connecticut and Rhode Island

Population Characteristics

Connecticut and Rhode Island

Total Population	4,638,115
Median Age	42
% Female	51
% Over Age 65	16
% White	69
% Black	9
% Below Federal Poverty Line	10
% Less than High School Education	7

Methods for Aim 1

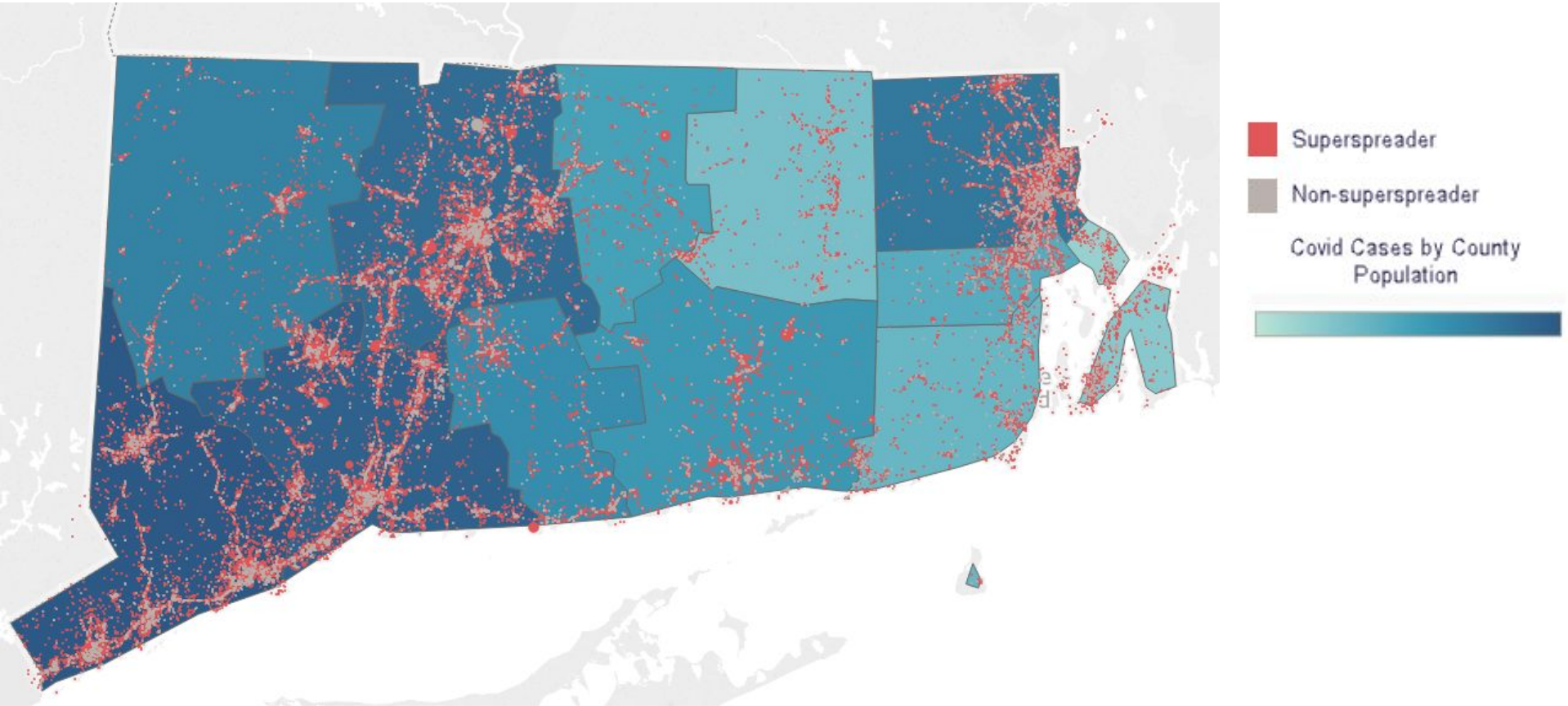
Developed a **Transmission Risk Index**

Calculated for 254 NAICS codes based on the interaction of frequency of visits and duration of visits to businesses pre-pandemic throughout 2019

Businesses in the upper quartile of the Transmission Risk Index as **super-spreader businesses**

County Level Confirmed Cases

with Business Locations



Methods for Aim 2

Test association between number of super-spreader businesses and rates of COVID-19 cases (weighted by population) using a negative binomial model:

$$\ln(cases) = \beta_0 + \beta_1 SuperSpreader + \beta_2 Covariates$$

Primary Outcome: Number of COVID-19 cases per 10,000 per week
Main Predictor: Super spreader business density
Covariates: gender composition, racial composition, percent of population above 65 years, percent of population below the poverty line, population density, and COVID testing

Primary Results

Higher density of super-spreader businesses is associated with increased rates of COVID-19

	COVID-19 Cases IRR/(SE)
Super-Spreader Business Density	1.24***
	(0.10)
Number of Observations	65

*** p < 0.01
Estimates are incidence rate ratios.
Weighted by total county population. Adjusted for population over age 65, racial distribution, population below the poverty line, COVID testing, and a time trend.
Standard errors clustered at the county-level.

Implications and Future Work

Identifying super-spreader businesses can help policy-makers strategically plan for reopening businesses in phases.

Rhode Island reopened some businesses earlier this week. We plan to use a difference-in-differences event study framework to estimate the dynamic effects of this re-opening on COVID-19 cases.

Thank you!

References

1. Data from “SafeGraph, a data company that aggregates anonymized location data from numerous applications in order to provide insights about physical places. To enhance privacy, SafeGraph excludes census block group information if fewer than five devices visited an establishment in a month from a given census block group."
2. https://www.nytimes.com/interactive/2020/05/06/opinion/coronavirus-us-reopen.html
3. https://www.census.gov/programs-surveys/acs
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   https://coronavirus.jhu.edu/data/cumulative-cases

To reproduce the results from the analysis, find the code here or scan the QR code.