



TARGETED STRATEGIES IN REDUCING THE SPREAD OF COVID-19

Effectiveness of policies on data-driven subgroups

JONATHAN TSAO

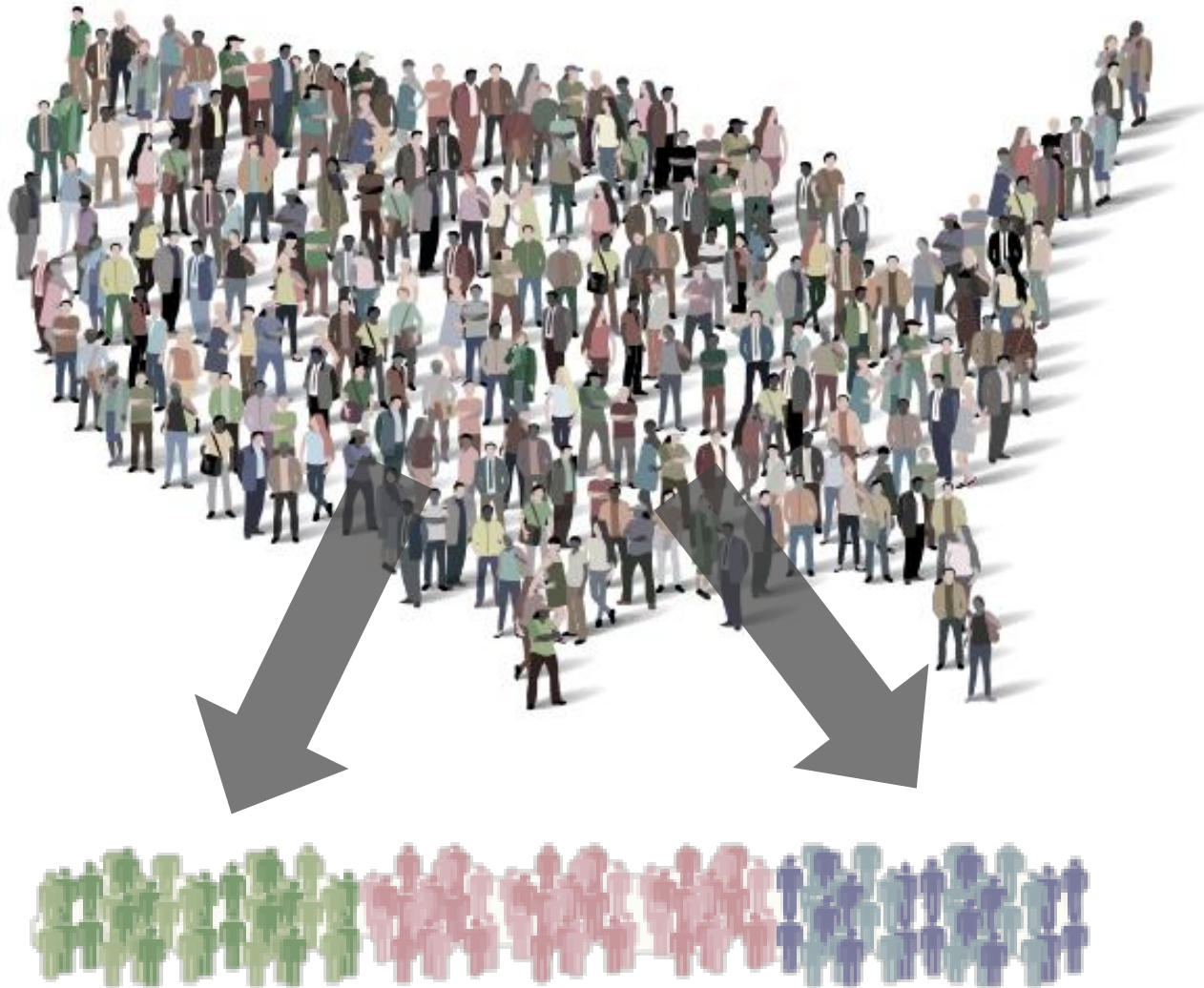


PROJECT MOTIVATION

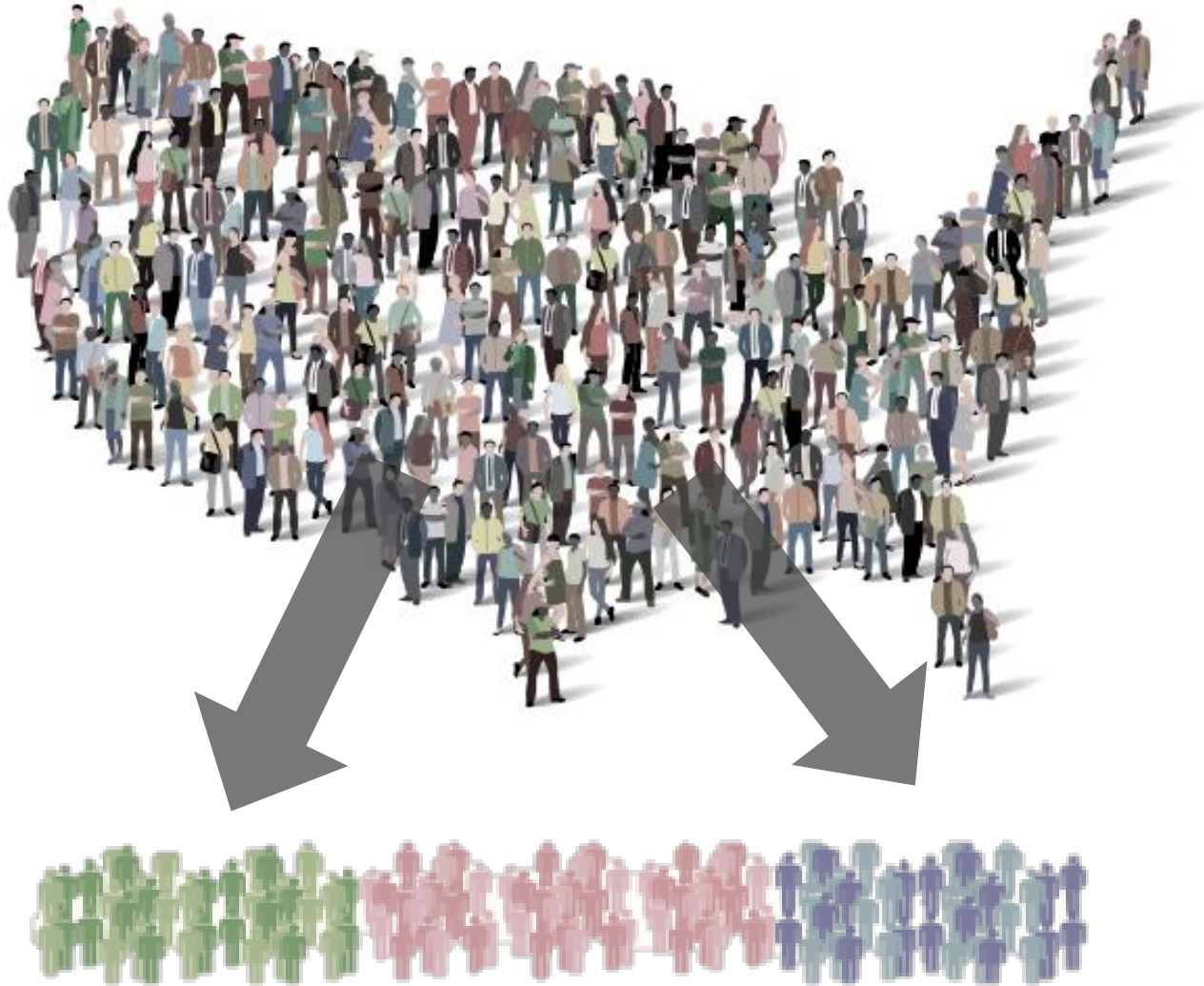
- The COVID-19 pandemic has significantly affected all of us.
- The effectiveness of state-mandated interventions (e.g. masks, stay at home, travel restrictions) are still debated
- There is vast heterogeneity among US states both in population and COVID-19 policies

We need a more **targeted** approach that would address **specific** needs of each community.

ADDRESSING THE PROBLEM



Identify subgroups based on community-level characteristics that would predict effectiveness of COVID-19 policies

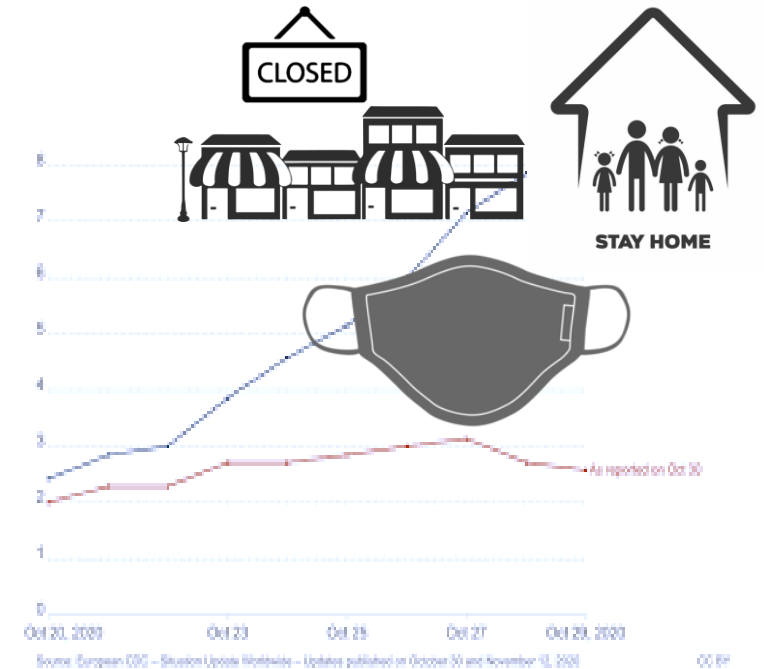


STEP 1: IDENTIFY SUBGROUPS

Use multivariate approaches (e.g. cluster analysis) to identify subgroups of communities using relevant characteristics (e.g. population density, income, age)

STEP 2: EVALUATE EFFECTIVENESS

Use identified subgroups to evaluate effectiveness of COVID-19 policies (e.g. mask mandate, stay at home, and business closure order) using positivity rate as a measure of COVID-19 spread



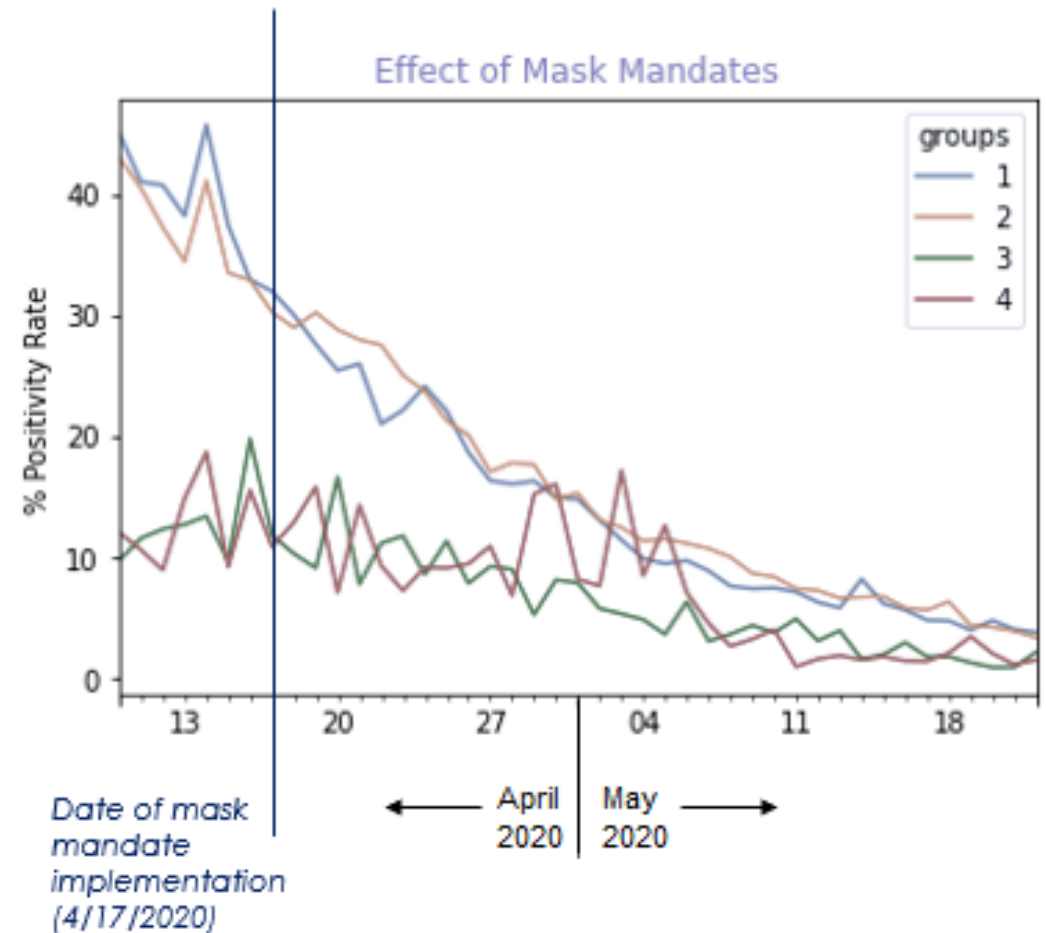
EFFECTIVENESS OF MASK MANDATE IN NY STATE

Preliminary analysis based on one state (NY) and using only two community characteristics.

Subgroups created using county-level population density and poverty rate:

- Group 1: High pop. density, high poverty
- Group 2: High pop. density, low poverty
- Group 3: Low pop. density, high poverty
- Group 4: Low pop. density, low poverty

	coef	std err	t	P> t	[0.025	0.975]
Intercept	22.6831	1.808	12.547	0.000	19.114	26.252
groups	-4.0157	0.660	-6.083	0.000	-5.319	-2.713



CURRENT DATABASES

- New York State Statewide COVID-19 Testing:
<https://health.data.ny.gov/Health/New-York-State-Statewide-COVID-19-Testing/xdss-u53e>
- Population Estimates (for Population Density):
<https://data.ny.gov/Government-Finance/Annual-Population-Estimates-for-New-York-State-and/krt9-ym2k>
- Land Area (for Population Density):
https://www.health.ny.gov/statistics/vital_statistics/2010/table02.htm
- Age and Poverty Rate Demographics:
 - Datausa.io
 - U.S. Census Tract Data
- COVID-19 US State Policy Database:
<https://www.openicpsr.org/openicpsr/project/119446/version/V44/view>

*These are all publicly available databases.

WHO WILL BENEFIT FROM THIS PROJECT?

*(WHO ARE
MY END USERS?)*



Policymakers



Public health officials



General public

Predictive algorithm for end users

Rapid identification of most appropriate
policies for their communities

Accelerate policy decision making

Save more lives

PROJECT OUTLINE



Week 1-2: Extensive data collection of samples and features (*county-level community characteristics for additional US states; effectiveness of multiple policies: mask, stay at home, business closure*)



Week 3-4: Examine and prepare data for analysis
Plot time-series (*pre/post policy*) & data visualization



Week 5-6: Create subgroups using clustering, including k-means; conduct dimensionality reduction



Week 7-8: Conduct predictive analysis of policy effectiveness; finalize predictive algorithm.



THANK YOU !