Risk-Based Decision Support Tools

May 12, 2020

Recap: Project Goals

Create **data-driven decision support tools to provide an additional input** into safely reopening the PA economy and achieve the following policy goals:

- **Minimize the diffusion** of COVID-19

- **Maximize return to work** and revitalize the economy

- **Limit long-term economic impact** of COVID-19 & the shut down

- **Achieve equitable outcomes** for vulnerable residents

Our Vision: Suite of Data-driven Decision Support Tools

Inputs: Data & Priorities

Current version primarily relies on Public Data from Census, BLS, BEA

Data from State Agencies: UI Claims, Wage Records, Revenue, SNAP, TANF, Medicaid, Revenue, DCED, Health

Health and Human Services Forecasts/Models from Partners (Pitt, Penn, and other partners)

State Priorities & Policy Goals

Decisions we plan to inform

Which industries can safely open, in which counties, and under what conditions?

What will be the health risks and economic impact associated with opening an industry?

Which industries can re-engineer workflows?

What impact will this have on vulnerable workers & businesses?

Outputs we seek

Health and Economic Monitoring Dashboard

Health Risks

Economic Impact

Impact on Equity

Evaluating the Impact of policy interventions

Risk-Based Approach

We take a wide variety of risks associated with re-opening a set of industries in a county or region. In addition to what we show in this presentation using public data, we are exploring and developing additional ones including:

- Face-to-Face Contact Risk (in workplaces)
- Nursing Home Spread Risk
- Customer Contact risk
- Supply Chain Risk
- Business Resilience risk
- Unemployment Risk
- Social Service Benefits Risk
- Equity Risk

How we intend the current risk indices to be used

- The current version primarily relies on public data sources to generate risk indices along a variety of dimensions

- The scores and risk indices do not correspond to "open" or "not open" recommendations

- These indices are provided to the State as one of many inputs they consider in making decisions affecting the "Process to Reopen Pennsylvania"

Risk Indices

COVID Case Risk: # of reported COVID-19 cases / population of area

Commute Risk: Risk of increase in "effective" case rate of county based on # of workers commuting from neighboring counties

ICU Capacity Risk: # of 60+ year olds in area / # of unoccupied ICU Beds

Population Density Risk: Population of Region / Area of Region

Population Age Risk: % of population in area > 60 yr old

Re-Opening Contact Risk: % of workers in an area employed in currently "physically closed" industry sectors

Commute Risk Explained

If a county with fewer than 50 out of 100,000 cases in the last 14 days is "opened":

Risk: **Nearby counties with a higher case rate** can **change the case rate of the newly opened county** if people who work in the newly opened county commute from the nearby counties.

Data: For each pair of counties, [ACS has data](#) on how many people live in county A and work in county B. For each county, we also have the case rates based on the previous 14 days.

Analysis: For each county, we calculate a risk of **increase in "effective case rate"** as a weighted average of case rates of counties where people commute from weighted by the % of workers in the "newly opened" county that come from the surrounding county.

What we're not considering in this version: Non work-commute travel across counties, Industry-level patterns, margin of error that ACS gives us for each county pair, and inter-state commutes.
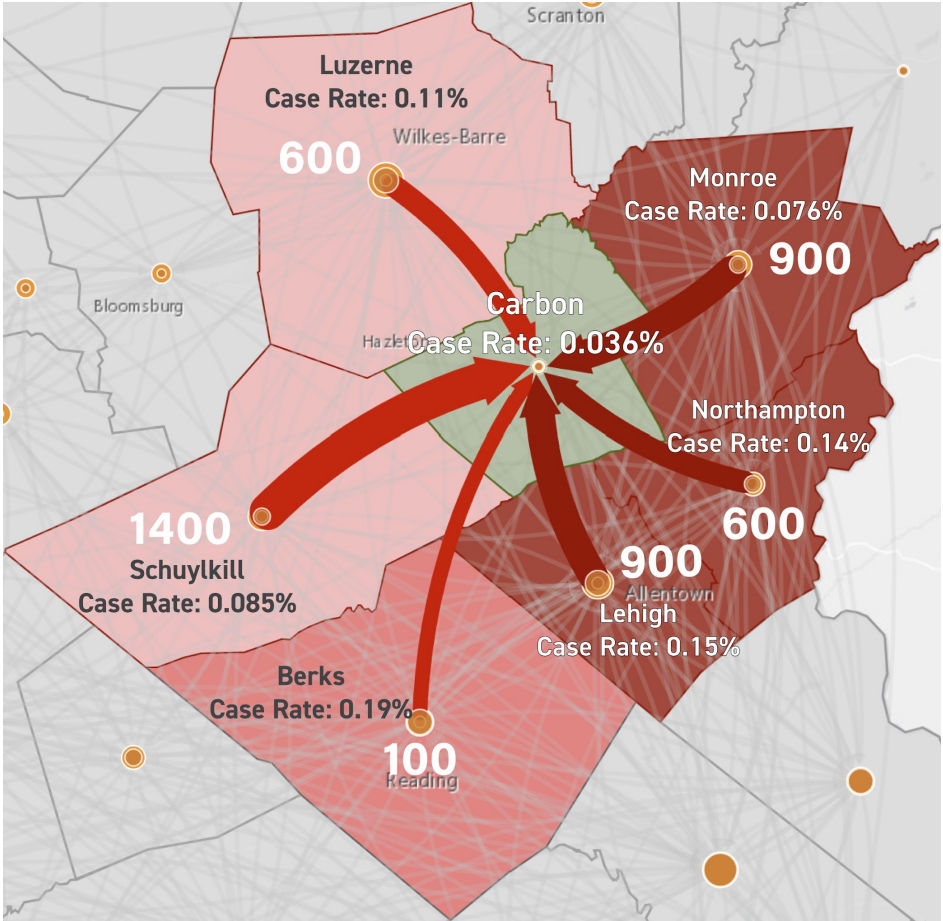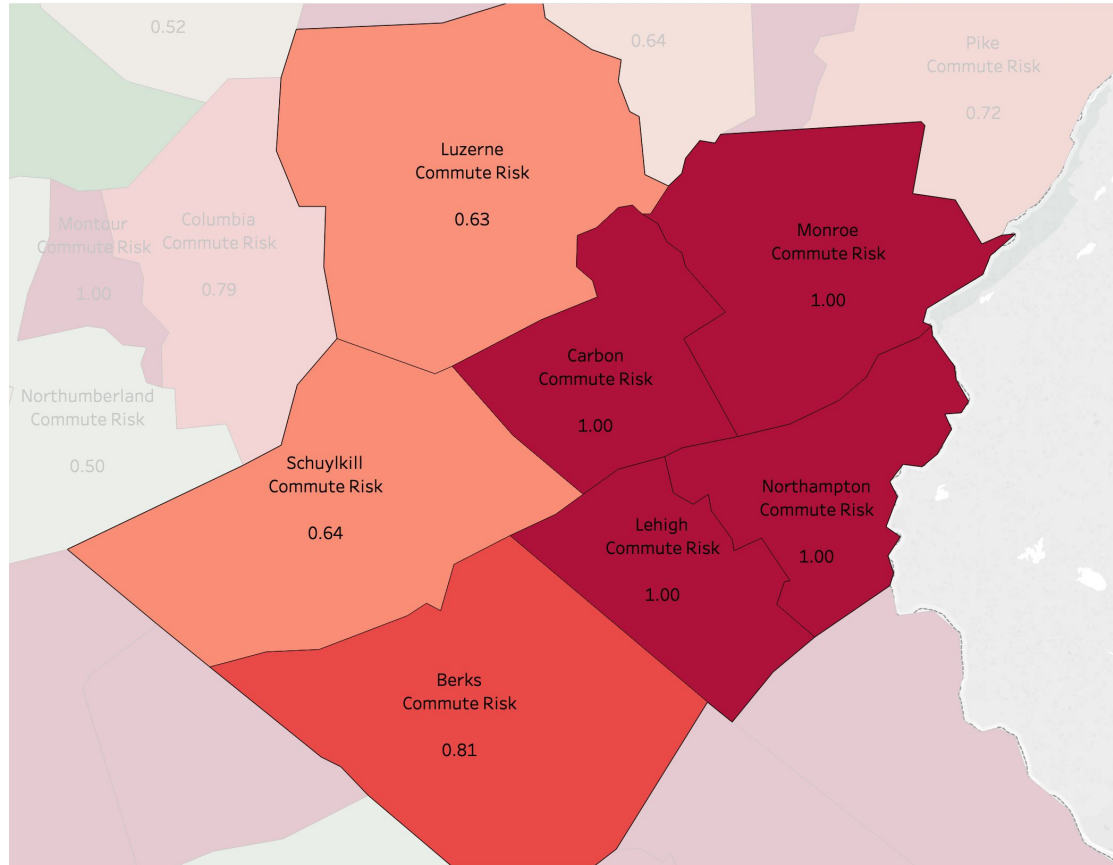
County to County Commute Patterns for PA
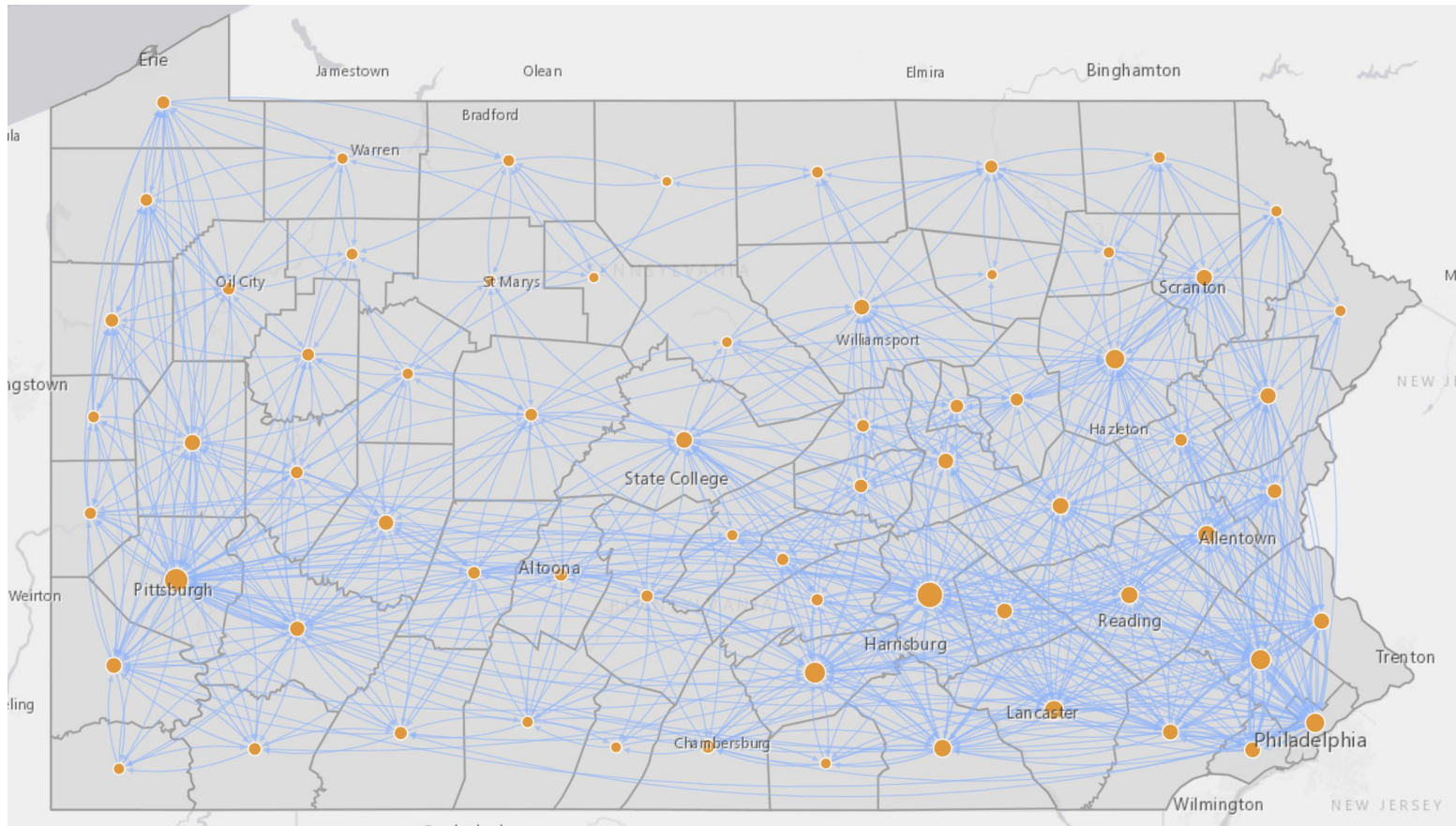
Example: Carbon County workers commute from:
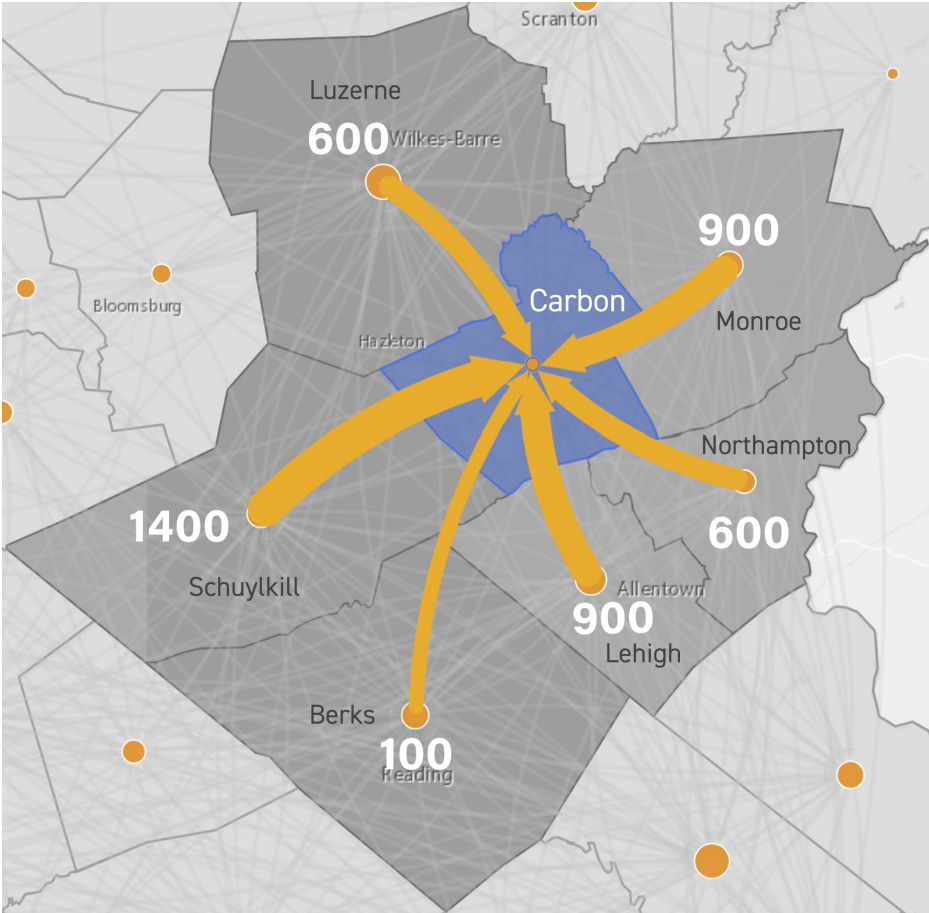
Example: Carbon County workers commute from:

... and increase the risk of transmission and infection

Example: Carbon County

If we open Carbon County with a current 14-day Case Rate of 0.036%

Number of People who work in Carbon County: ~17000

Of those, 12000 Commute locally from Carbon (Case Rate: 0.036%)

1400 Commute from Schuylkill (Case Rate: 0.085%)

900   Commute from Monroe   (Case Rate: 0.076%)

900   Commute from Lehigh   (Case Rate: 0.15%)

600   Commute from Luzerne   (Case Rate: 0.11%)

600   Commute from Northampton   (Case Rate: 0.14%)

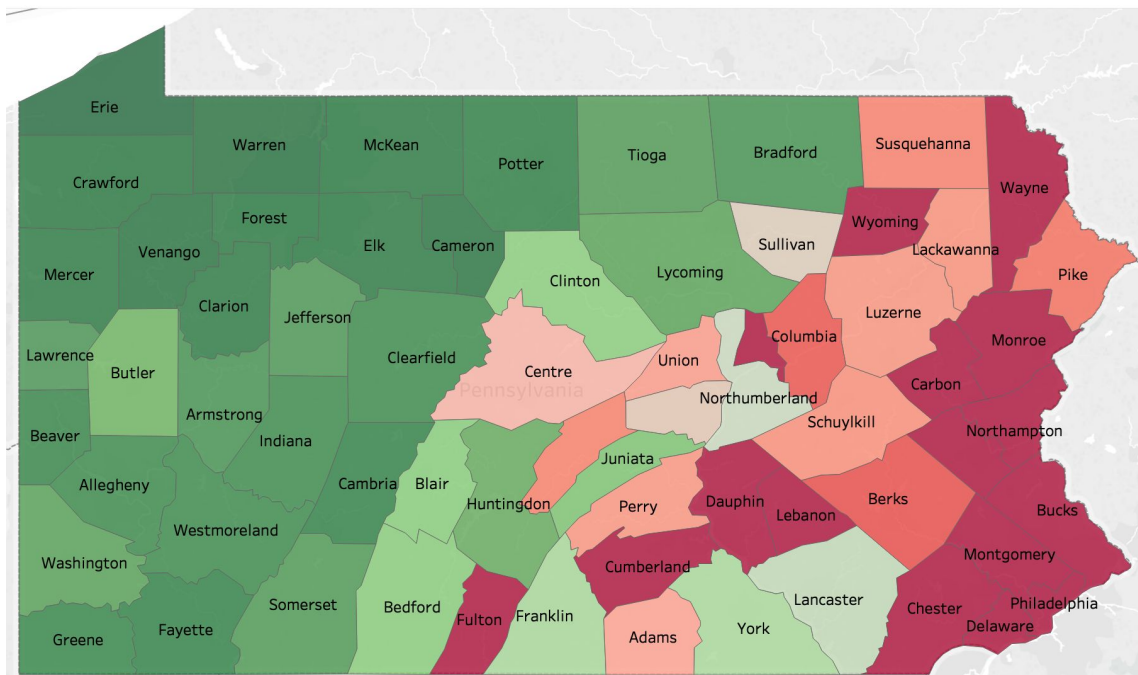**100   Commute from Berks   (Case Rate: 0.19%)**

...   **…**

When workers from these counties commute to Carbon, the prevalence among the Carbon workforce **goes up to 0.057%** (compared to the current case rate 0.036%)
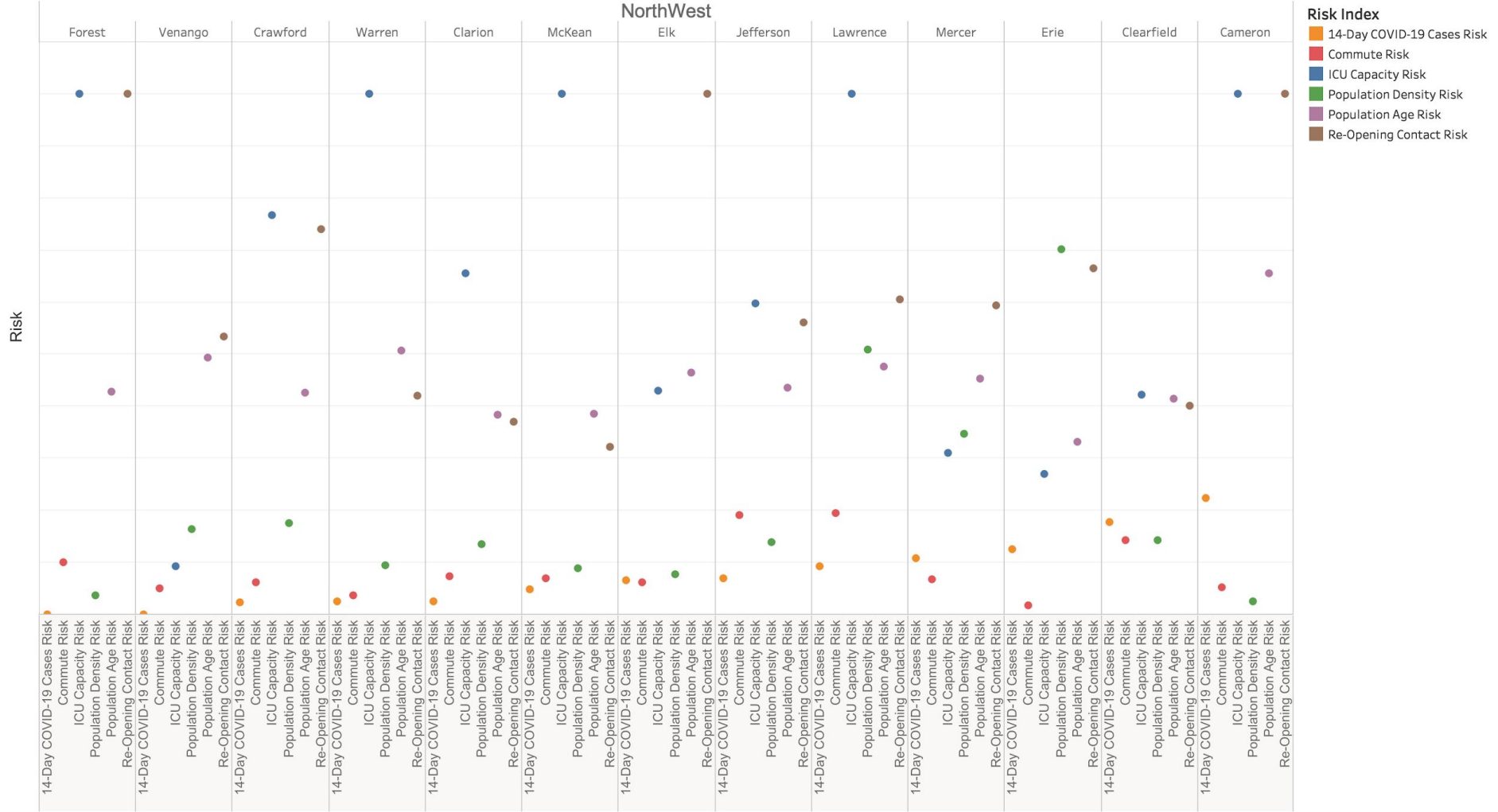
Commute Risk

County Name S..	County Case Rate	New Workforce Case Rate	Commute Risk
Montgomery	0.151%	0.167%	1.00
Chester	0.119%	0.133%	1.00
Fulton	0.041%	0.092%	1.00
Lehigh	0.153%	0.146%	1.00
Bucks	0.220%	0.196%	1.00
Philadelphia	0.220%	0.188%	1.00
Northampton	0.140%	0.135%	1.00
Delaware	0.272%	0.218%	1.00
Wayne	0.043%	0.067%	1.00
Dauphin	0.100%	0.088%	1.00
Lebanon	0.125%	0.122%	1.00
Monroe	0.076%	0.085%	1.00
Cumberland	0.064%	0.068%	1.00
Wyoming	0.037%	0.052%	1.00
Carbon	0.036%	0.057%	1.00
Montour	0.011%	0.037%	1.00
Berks	0.191%	0.178%	0.81
Columbia	0.058%	0.061%	0.79
Pike	0.136%	0.111%	0.72
Susquehanna	0.010%	0.024%	0.68
Schuylkill	0.085%	0.085%	0.64
Lackawanna	0.159%	0.140%	0.64
Luzerne	0.108%	0.106%	0.63
Mifflin	0.039%	0.050%	0.68
Adams	0.035%	0.040%	0.59
Perry	0.017%	0.028%	0.62
Centre	0.018%	0.028%	0.55
Union	0.018%	0.025%	0.60
Northumberland	0.037%	0.038%	0.50
Lancaster	0.105%	0.105%	0.50
York	0.037%	0.042%	0.47
Franklin	0.178%	0.154%	0.47
Snyder	0.000%	0.013%	0.53

Commute Risk

County Risks
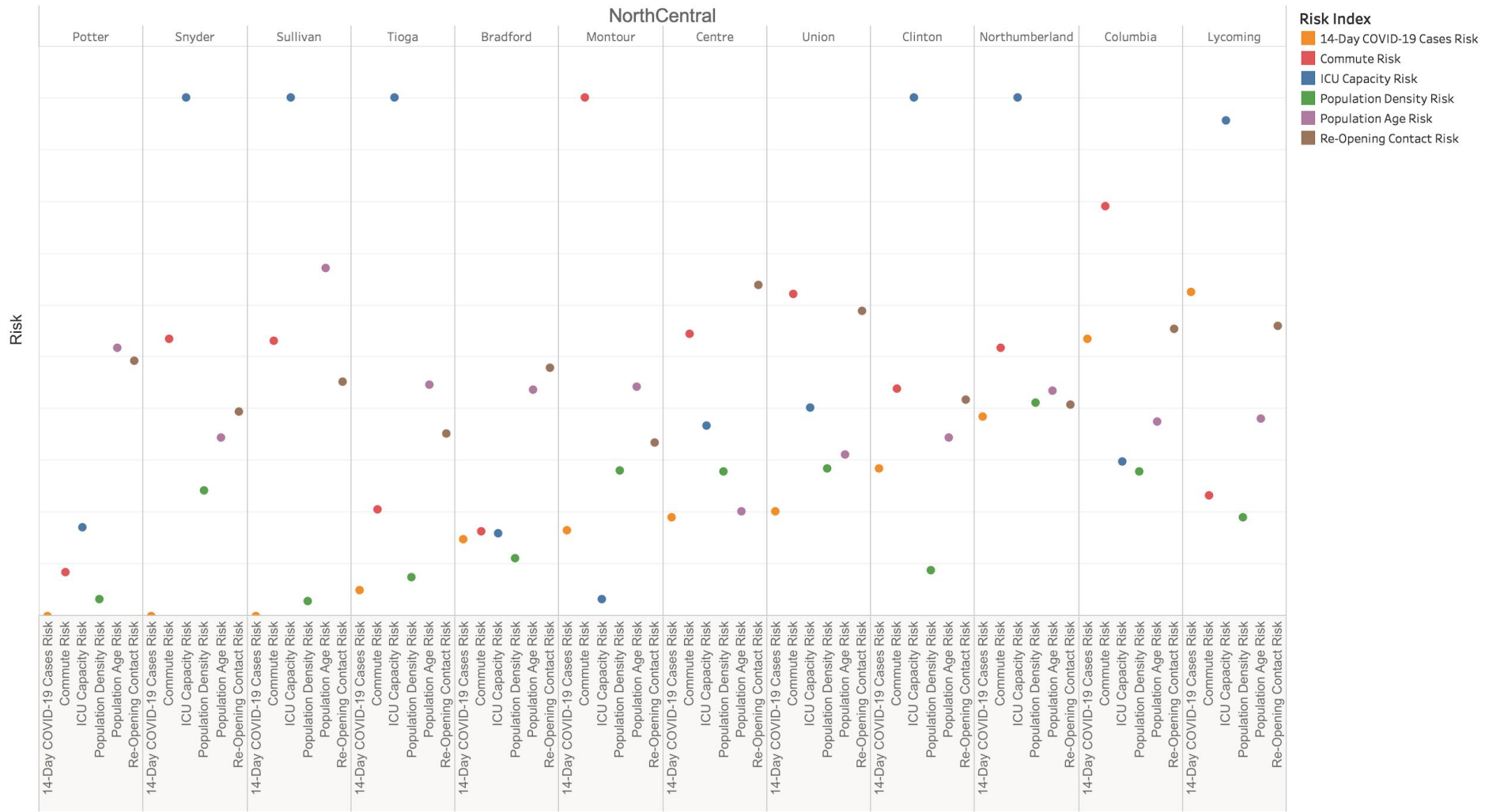
NorthWest

Risk Index
- 14-Day COVID-19 Cases Risk
- Commute Risk
- ICU Capacity Risk
- Population Density Risk
- Population Age Risk
- Re-Opening Contact Risk

County Risks

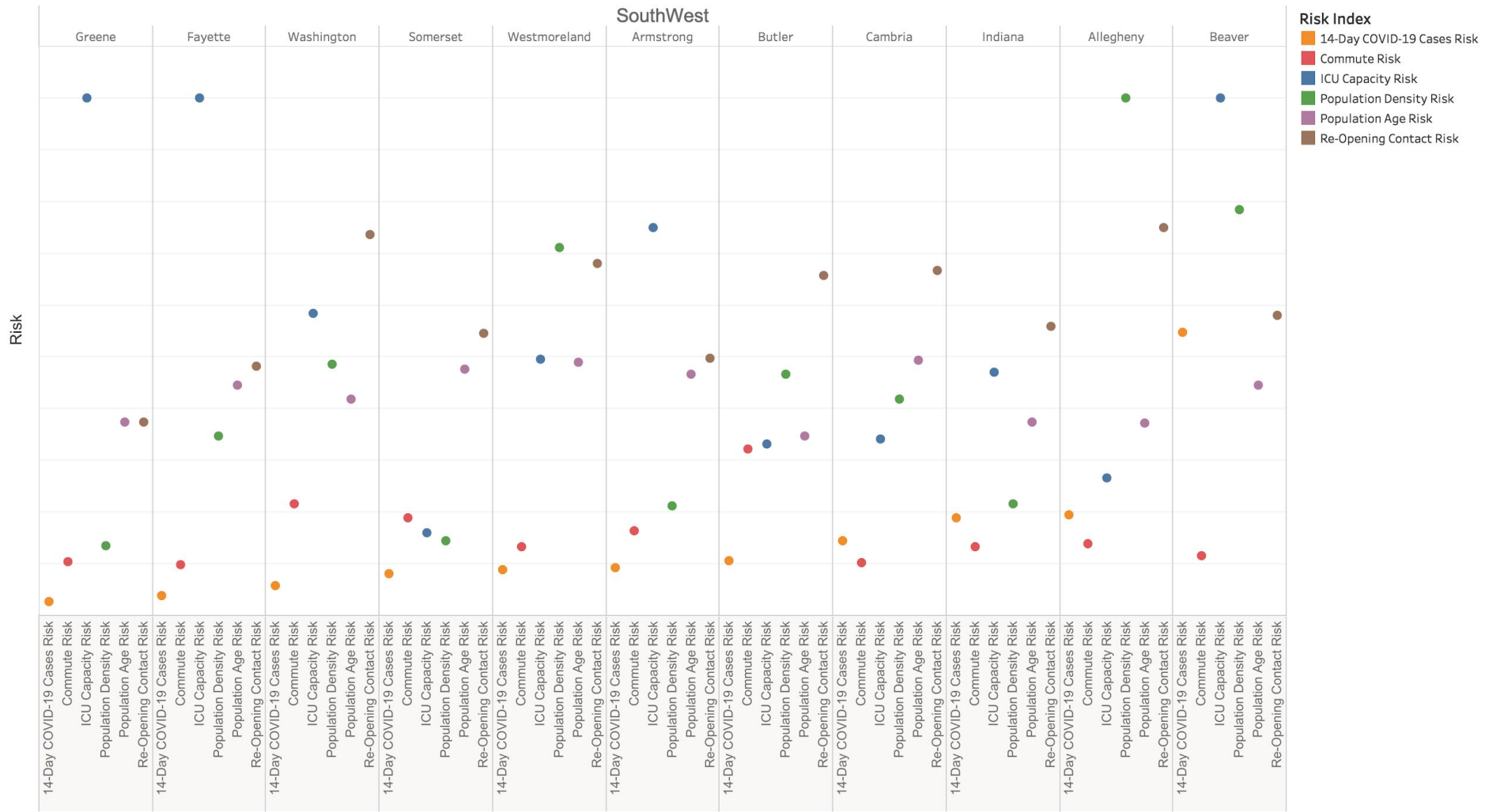# County Risks

NorteEast

County Risks

County Risks

SouthCentral

County Risks

SouthWest
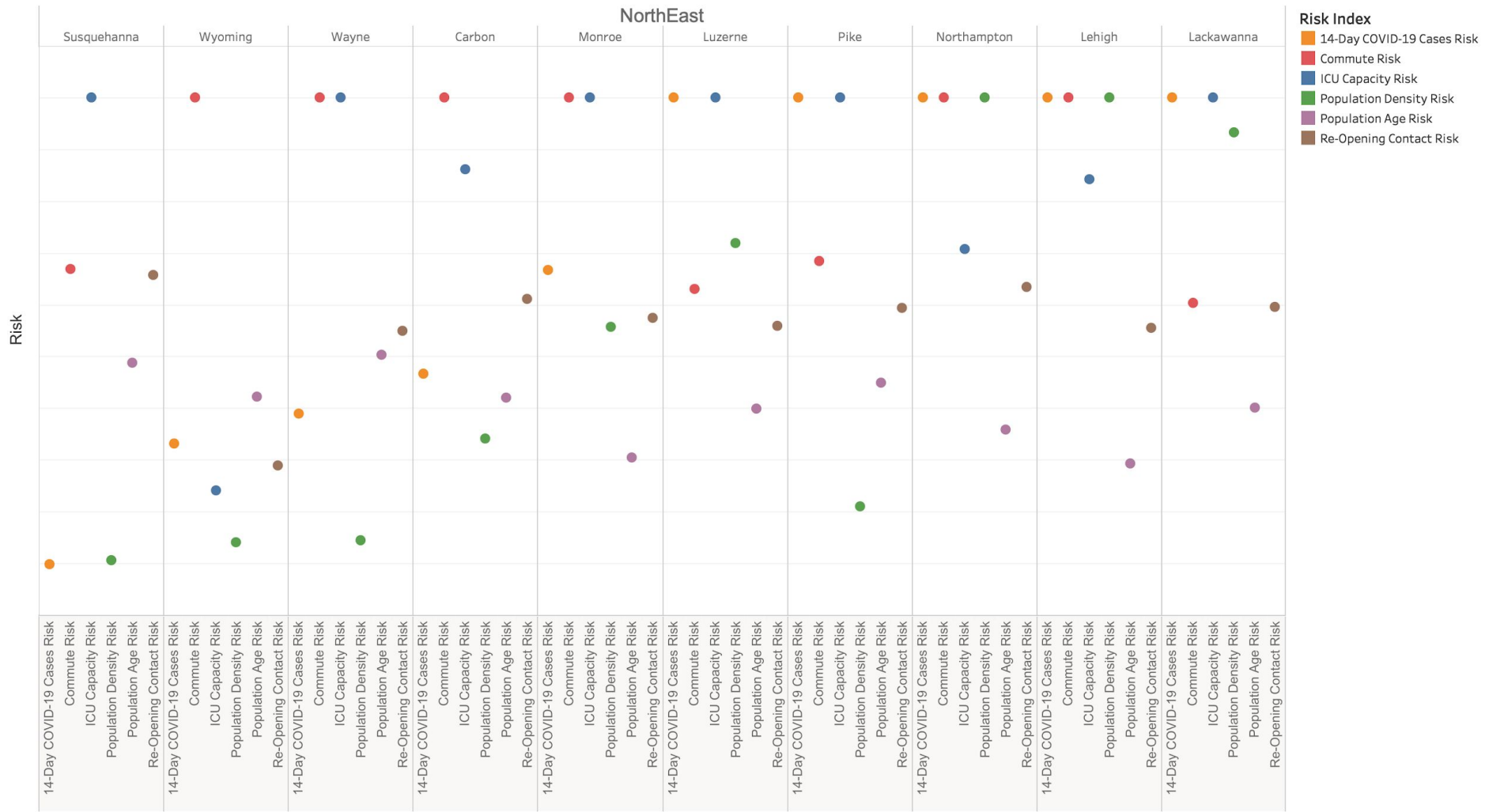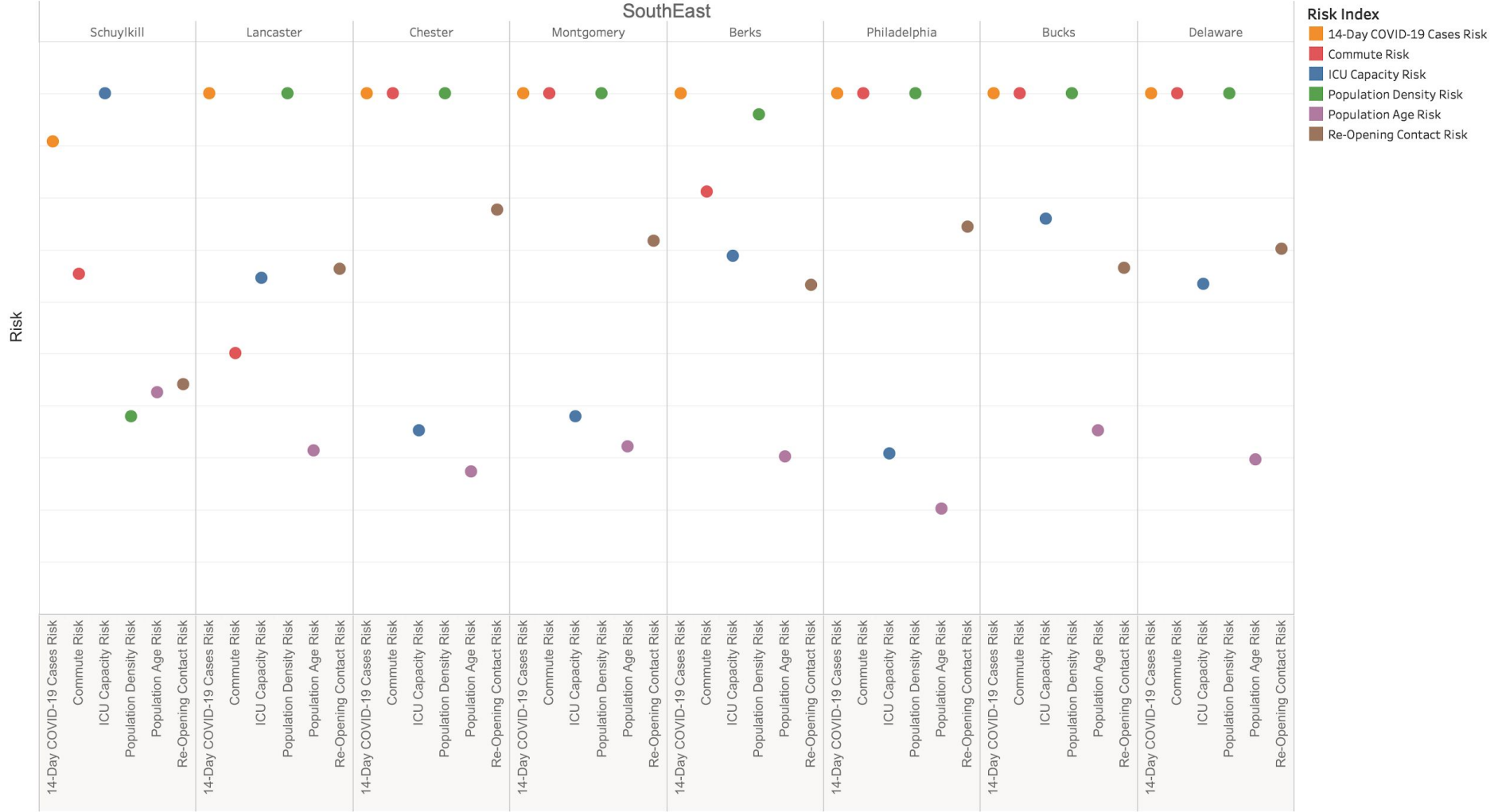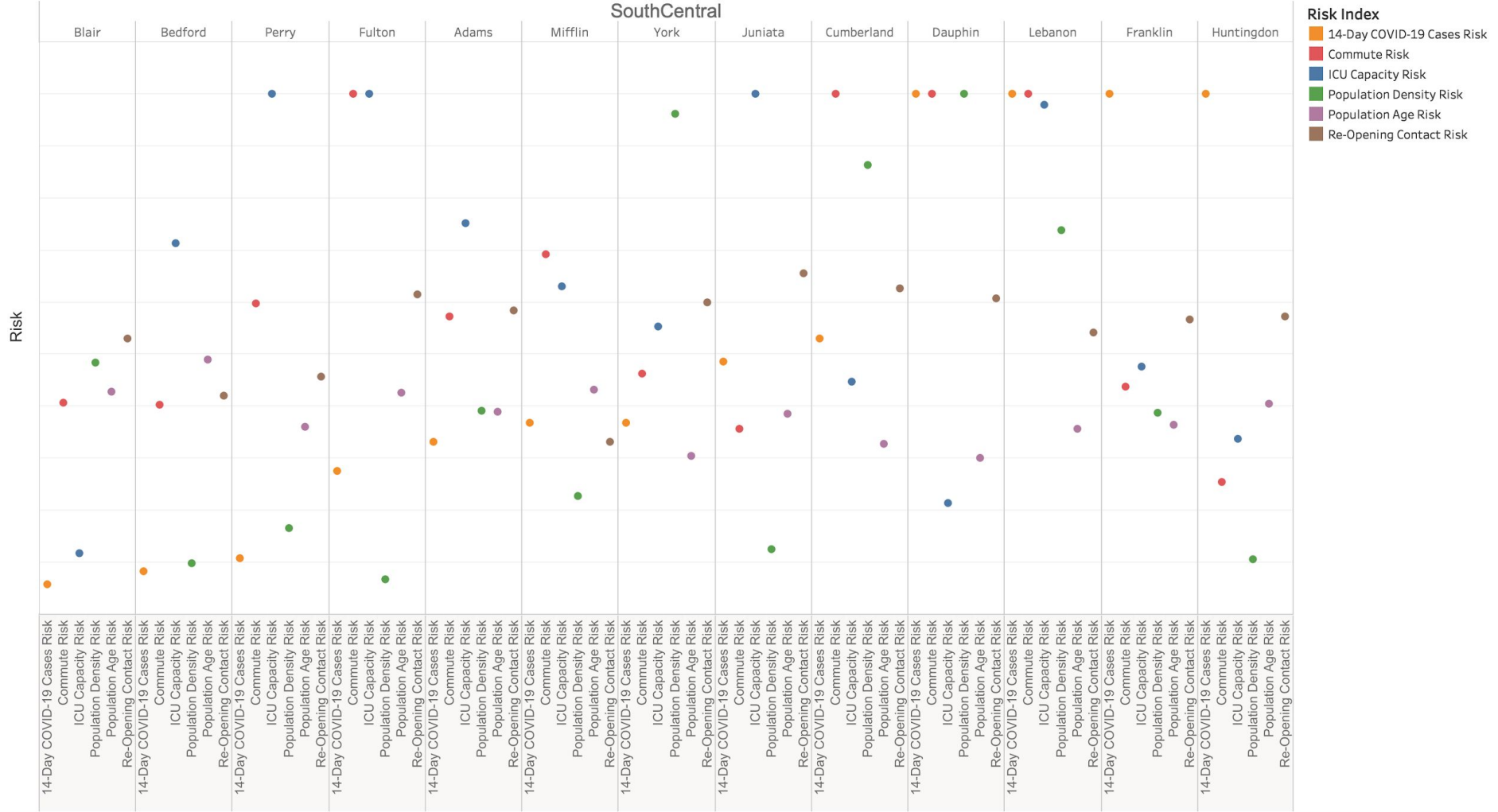
County Scorecard

Extensions we plan to do as we get access to detailed State data

- Adjust commuting risk based on actual employed vs unemployed individuals
- Adjust commuting risk based on the industry of the workers commuting
- Adjust ICU Risk based on the corresponding Hospital Referral Regions
- Add Disparate Impact Risk based on industry and demographics of the workers affected