

Considering the challenges of working with subcounty level data using COVID-19 as a case study

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ENVIRONMENTAL PUBLIC HEALTH
TRACKING

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Agenda

- Objective
- Methods
- Results
- Conclusion



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The Coronavirus Does Discriminate: How Social Conditions are Shaping the COVID-19 Pandemic

May 5th, 2020

Part of this developing crisis is very well known: On December 31, 2019, Chinese officials reported a cluster of pneumonia cases in Wuhan and identified the **novel coronavirus** as the causative agent on January 7, 2020. This novel coronavirus spread rapidly, and on March 11, 2020, the **World Health Organization** declared COVID-19 a pandemic. To date, there are more than 1 million **confirmed cases** in the United States and 3.5 million worldwide.

Objective

- Explore ways to develop a viable analysis from low-reliability data for small geographies.
- Apply these methods to the ongoing COVID-19 pandemic.

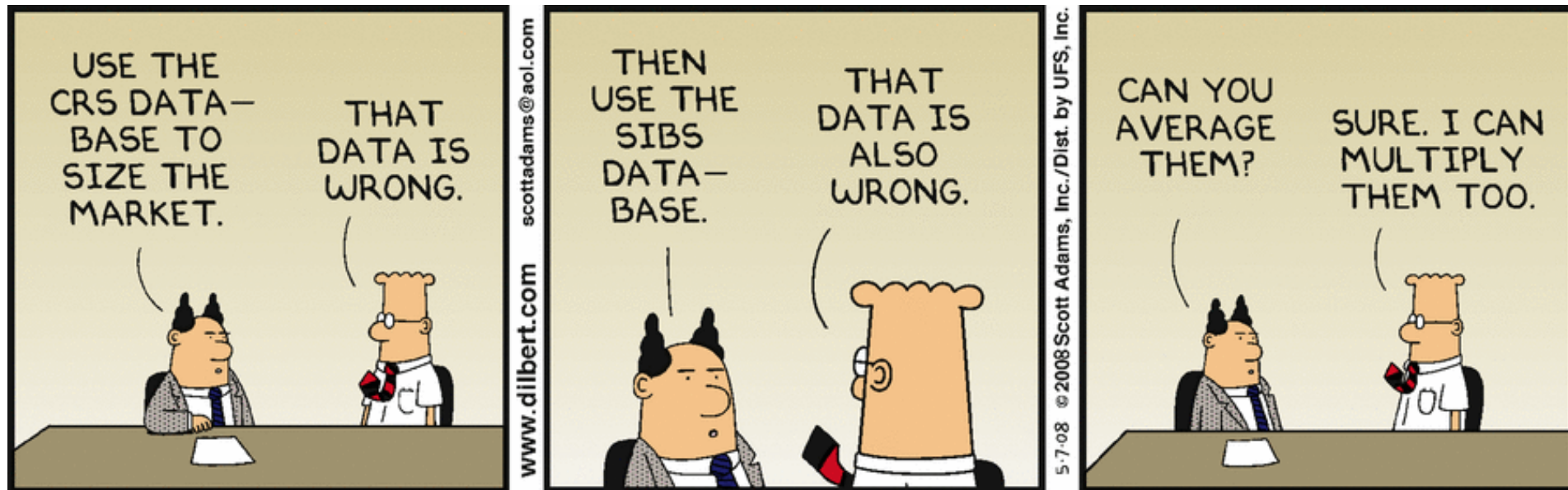


Image credit; Dilbert Comic Strip by Scott Adams

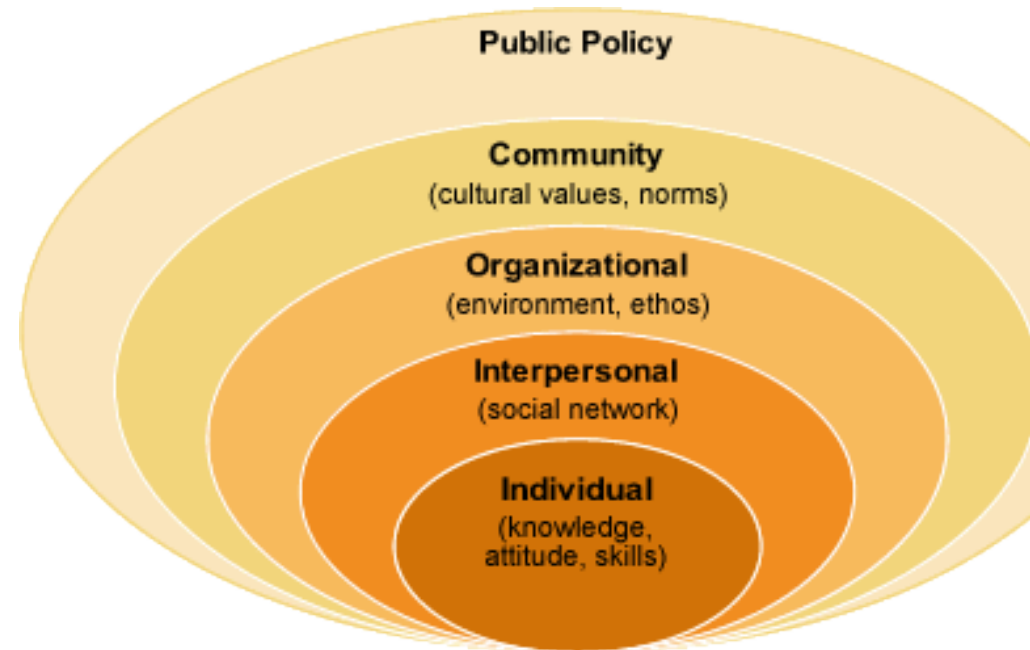
CDC's Social Vulnerability Index (SVI)

Minority status and language Racial or ethnic minority Speaks English "less than well"	Socioeconomic status Aged ≤ 65 Aged ≤ 17 Aged 5+ with disability Single-parent households
Housing and transportation Multi-unit housing Mobile homes Crowding No vehicle Group quarters	Household and disability Below poverty line Unemployed Income No high school diploma

- Each census tract is evaluated for 15 social factors and then ranked for each individual factor, as well as an overall ranking.
- Data is derived from the American Community Survey (ACS) 2018.

Relevance to COVID-19

Goal of CDC’s SVI is “to help public health officials and emergency response planners identify and map the communities that will most likely need support before, during, and after a hazardous event.”



Social Vulnerability & Equity

> [Public Adm Rev.](#) 2020 Jun 22;10.1111/puar.13264. doi: 10.1111/puar.13264. Online ahead of print.

Social Vulnerability and Equity: The Disproportionate Impact of COVID-19

Tia Sherèe Gaynor ¹, Meghan E Wilson ²

Affiliations + expand

PMID: 32836465 PMCID: [PMC7361760](#) DOI: [10.1111/puar.13264](#)

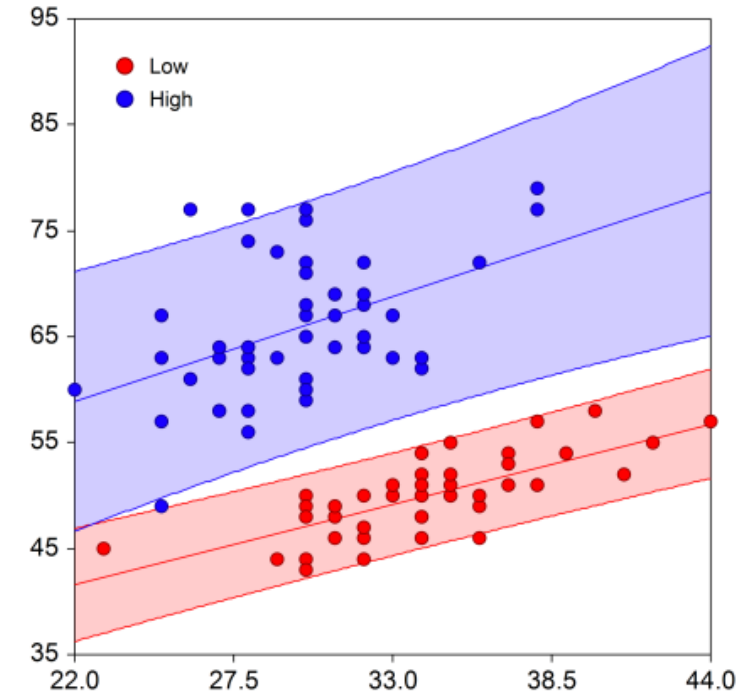
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Abstract

As the architect of racial disparity, racism shapes the vulnerability of communities. Socially vulnerable communities are less resilient in their ability to respond to and recover from natural and man-made disasters when compared to resourced communities. This essay argues that racism exposes existing practices and structures in public administration that, along with the effects of

Summarize Reliability

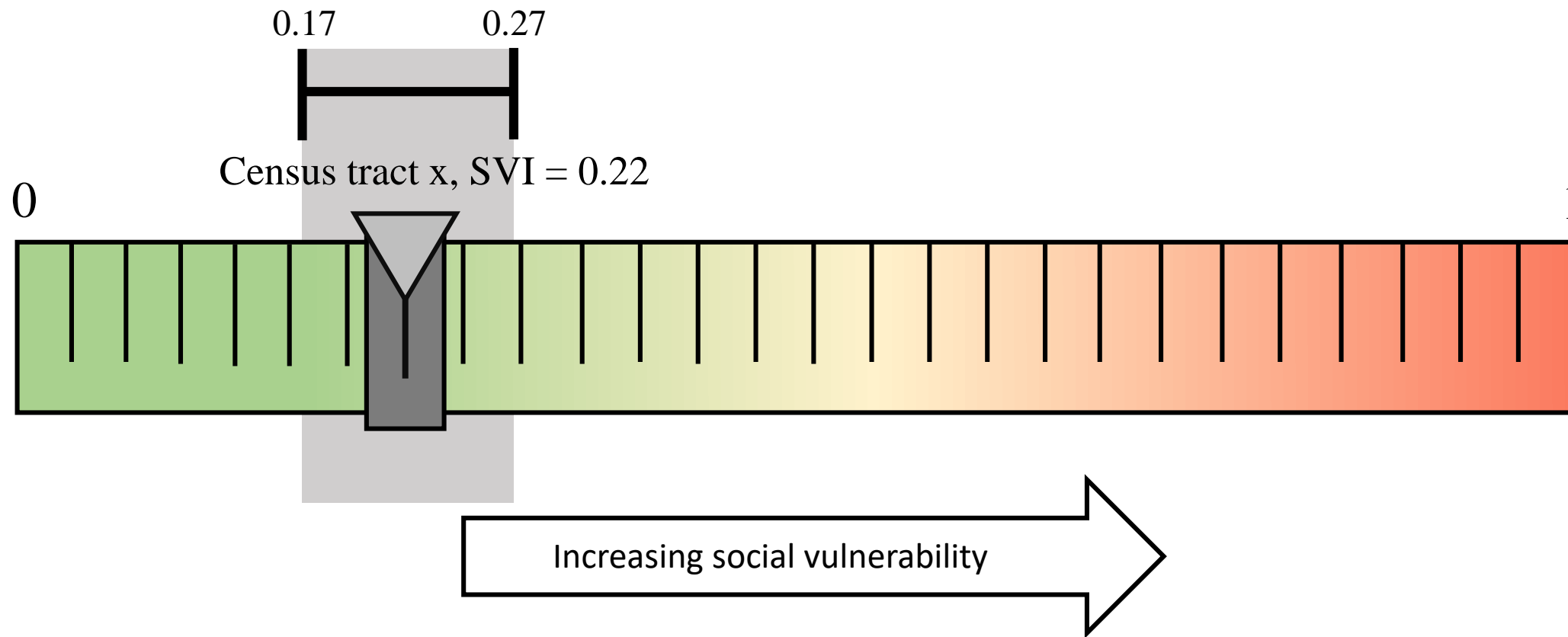
<p>Minority status and language</p> <p>Racial or ethnic minority</p> <p>Speaks English “less than well”</p>	<p>Socioeconomic status</p> <p>Aged ≤ 65</p> <p>Aged ≤ 17</p> <p>Aged 5+ with disability</p> <p>Single-parent households</p>
<p>Housing and transportation</p> <p>Multi-unit housing</p> <p>Mobile homes</p> <p>Crowding</p> <p>No vehicle</p> <p>Group quarters</p>	<p>Household and disability</p> <p>Below poverty line</p> <p>Unemployed</p> <p>Income</p> <p>No high school diploma</p>



Low	Medium	High
CV > 40	40 ≥ CV > 12	CS ≤ 12

Addressing this Challenge

CDC's original continuous SVI:



Objective

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Methods

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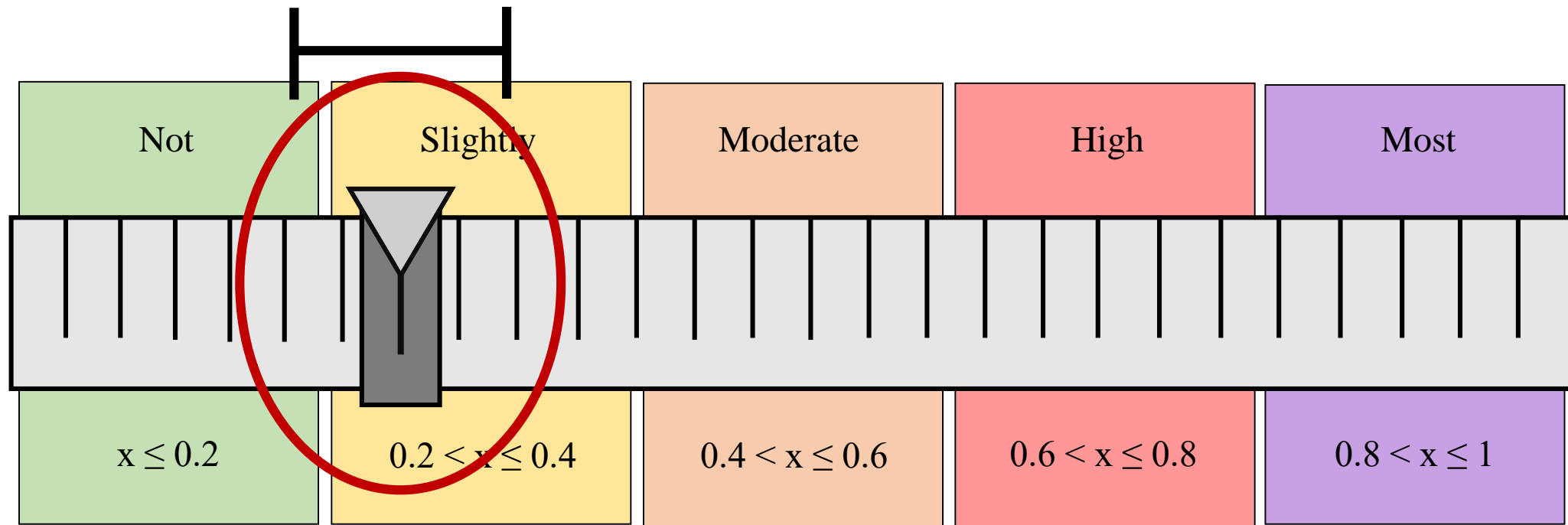
Results

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Conclusion

Addressing this Challenge

Developed quintiles to address this challenge:



Our Analysis

H_0 : SVI category has no significant effect on incidence rate of COVID-19.

H_A : SVI category does have a significant effect on incidence rate of COVID-19

Examined this with a Poisson regression:

$$\left[\frac{\text{count of covid cases}}{\text{population}} \right]_{\text{census tract}} = \beta_0 + \beta_1 [SVI]_{\text{census tract}}$$

Our Results

Predictors	Incidence Rate Ratios	CI	p
Slightly vulnerable	1.32	1.20 – 1.44	<0.001
Moderate vulnerability	1.36	1.24 – 1.49	<0.001
High vulnerability	1.93	1.78 – 2.11	<0.001
Most vulnerable	2.96	2.74 – 3.21	<0.001
Observations	709		
R ² Nagelkerke	0.798		

Lessons and Implications

For the community:

Must consider social vulnerability factors when developing recovery and future preparedness protocol.

Design interventions that target these factors to improve community resilience.



Lessons and Implications

BEWARE & BE AWARE

Limitations and reliability of data:

- Variation/reliability
- Sample size
- Coverage/capture
- Representativeness
- Sampling bias
- Sample error



Next Steps

- Improve the SVI index by identifying additional Oregon-specific variables (ex: demographic, health, environmental).
- Apply this method to other geographic scales (ex. county, zip code, communities).
- Increase community participation and promote a transparent relationship between public health organizations and local communities when developing social vulnerability metrics.



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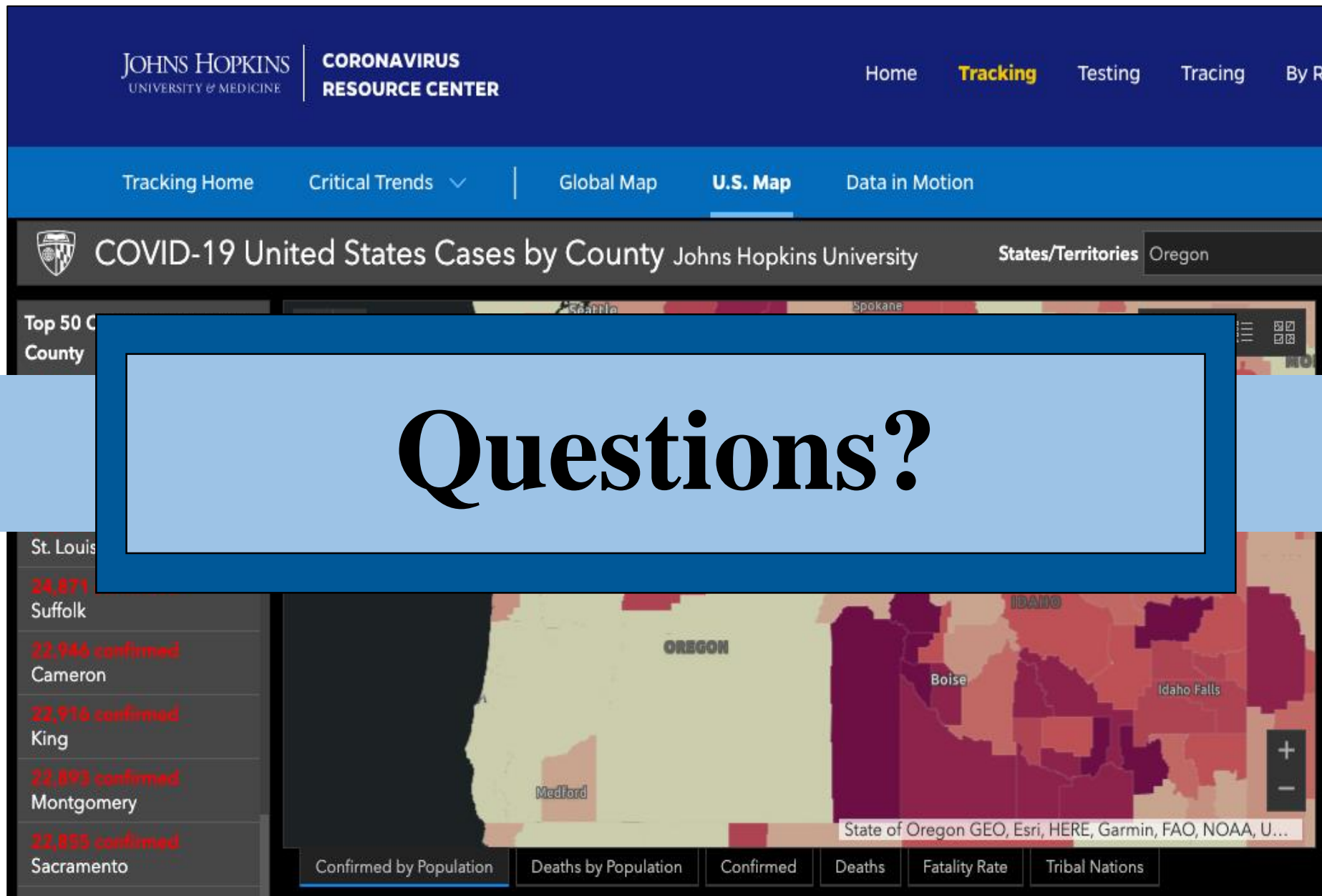
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- Adam Branscum, PhD

Dartmouth College

- Andrew Friedland, PhD





Objective

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**Thank you
and stay safe**



Objective

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