

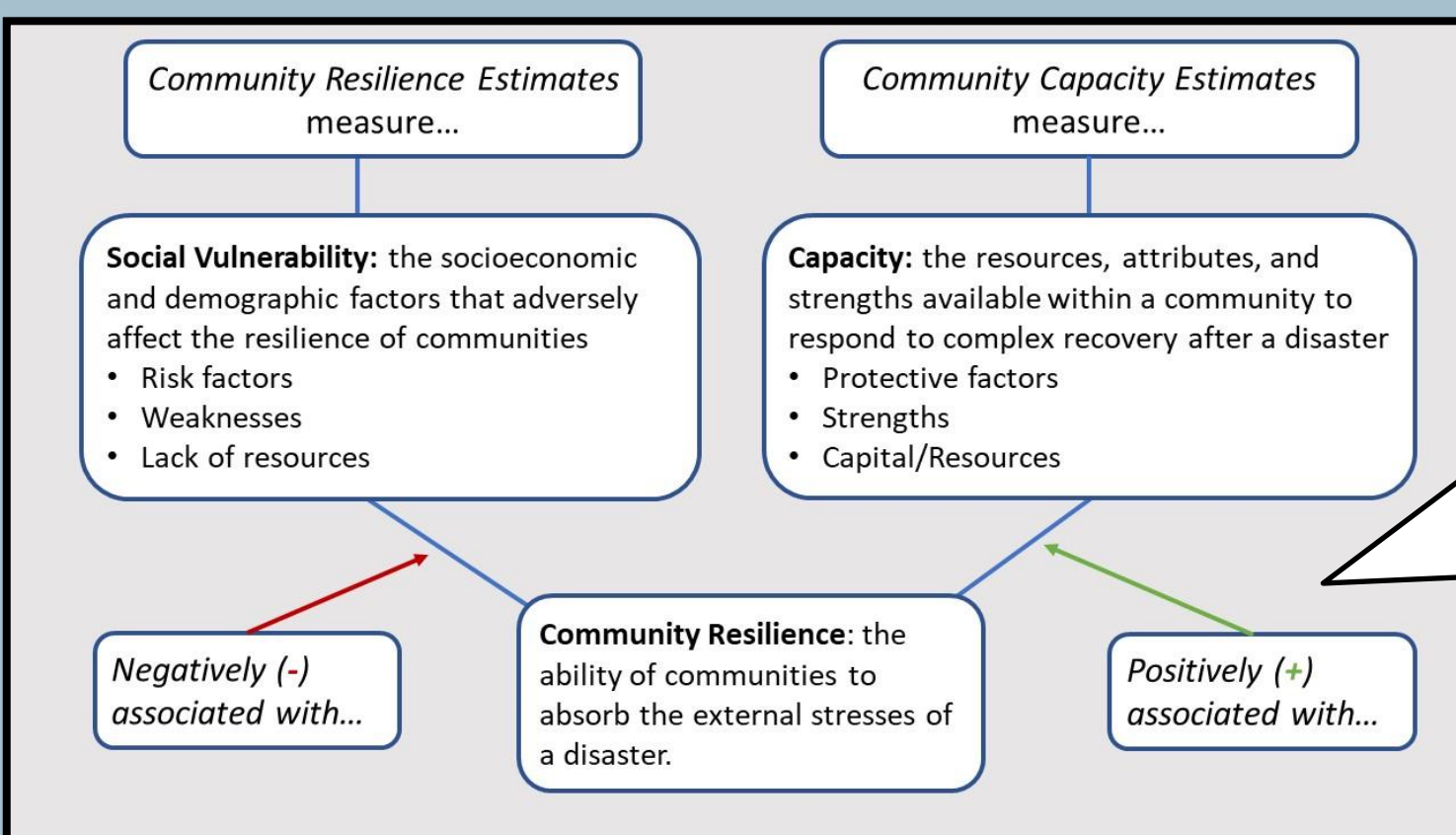
# Socially Vulnerable yet Highly Resourced? Comparing the New Community Capacity Estimates to the Community Resilience Estimates

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Benjamin Gurrentz  
Social, Economic, and Housing Statistics Division  
Demographic Directorate  
U.S. Census Bureau

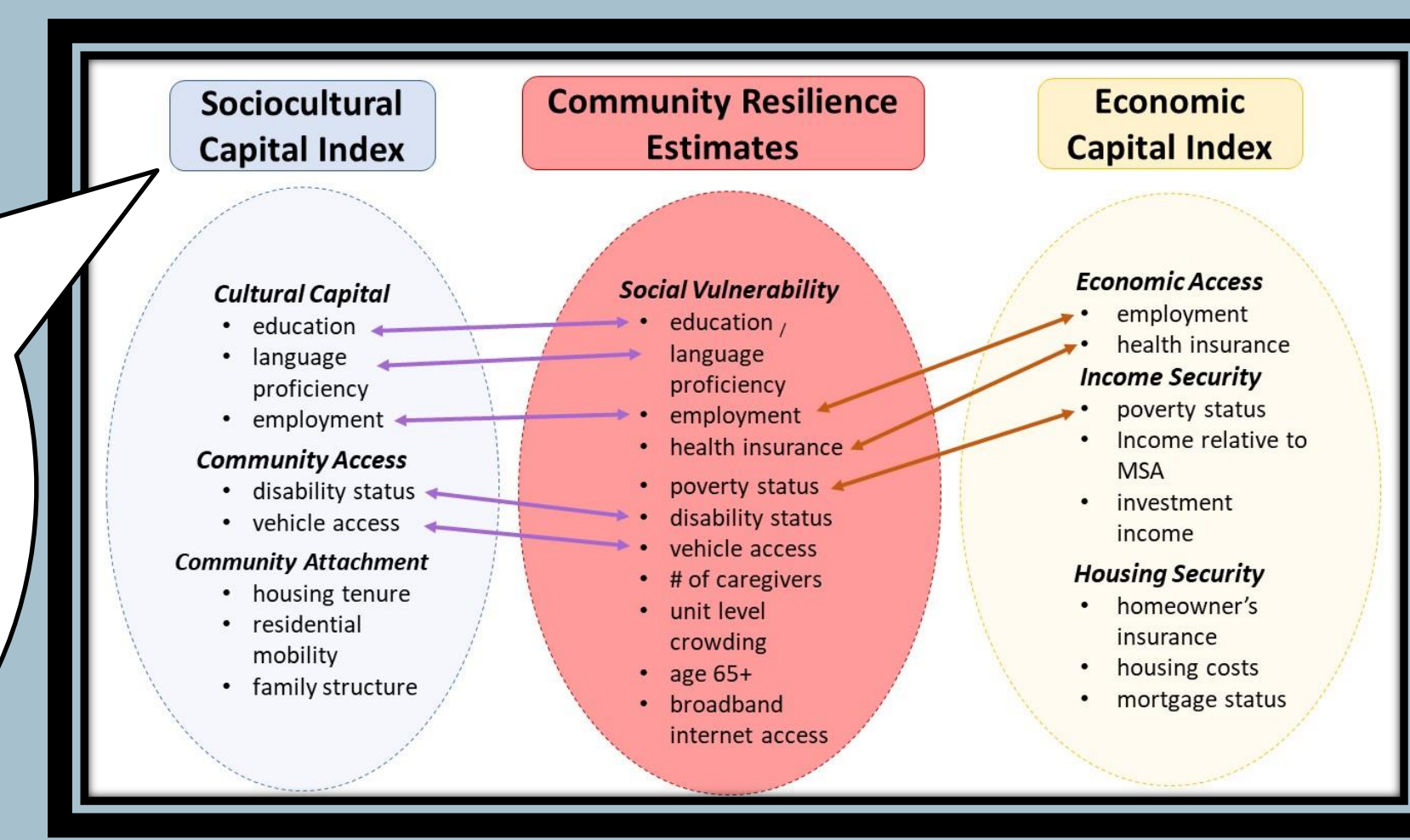
## BACKGROUND

- Community Resilience Estimates (CRE)** -- Released as experimental estimates in December 2020 during the COVID-19 pandemic and now a recurring Census Bureau product, the CRE measure the social vulnerability of an area (state, county, and census tract) in the context of natural disasters.
  - In September 2021, the Census Bureau released the CRE for Equity Supplement. The supplement includes the 2019 CRE as well as additional 2019 American Community Survey (ACS) 5-year data related to the CRE vulnerability indicators. This file provides social context for CRE and flags variables that are higher than the national average.
- Experimental Community Capacity Estimates (CCE)** -- In 2023, the Census Bureau plans to release the experimental CCE, which measure the resources, attributes, and strengths available within a community to respond to complex recovery after a disaster.
  - The experimental CCE is divided into two separate indexes: Sociocultural Capital Index (SCI) and Economic Capital Index (ECI). Sociocultural capital refers to who/what you know, while economic capital measures what you have. Future iterations will include physical capital, human capital, and total capacity.



Both estimates measure disaster resilience. However, the concepts they measure -- social vulnerability (CRE) and community resources (CCE) -- are distinct as well as *inversely* related.

And while both estimates use small area estimation methods, ACS 1-year restricted microdata, and some similar indicators from the ACS, there are a number of ACS indicators that differ.

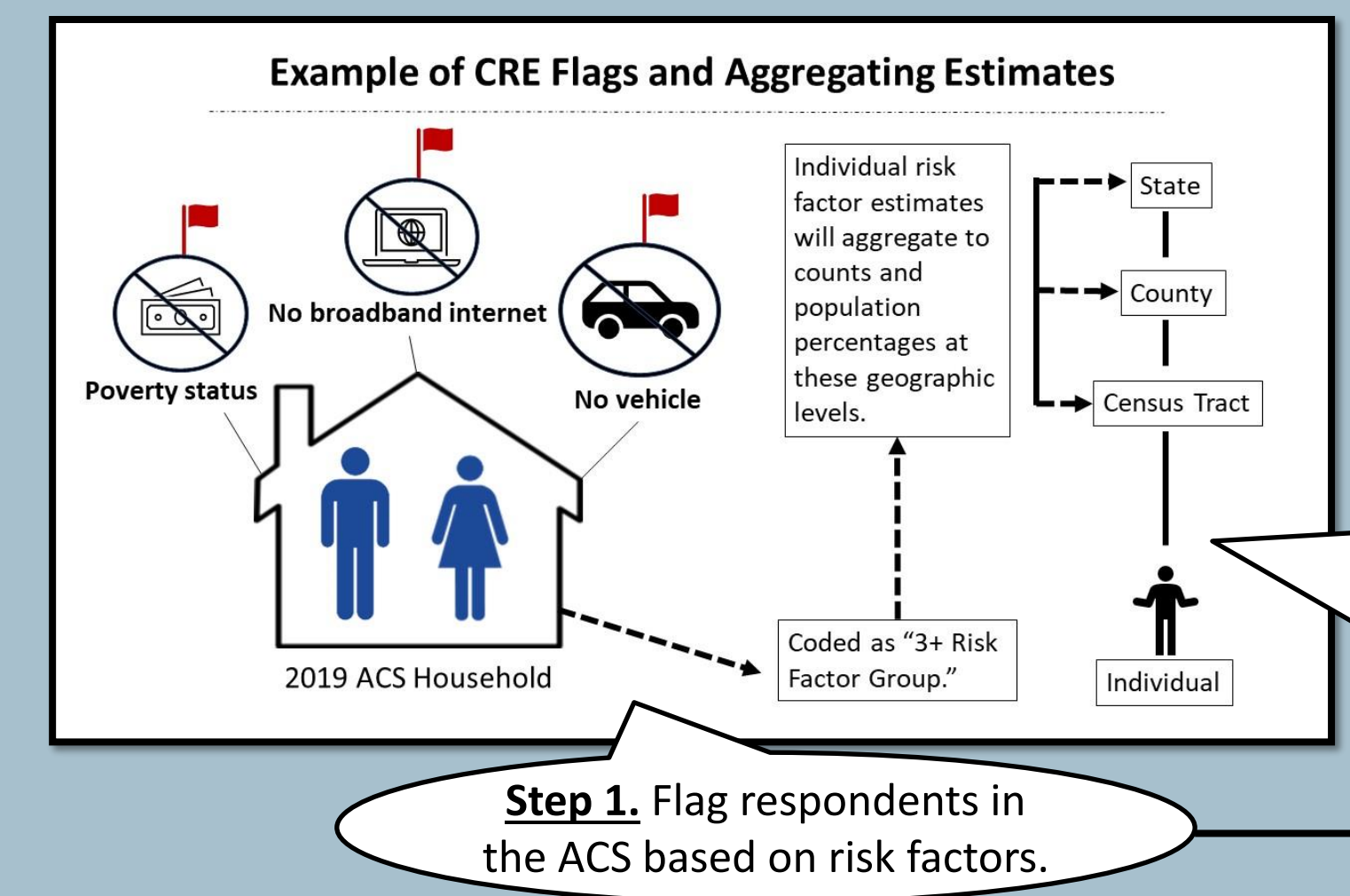


## RESEARCH QUESTIONS

- How much overlap is there between the high-risk vulnerable populations in the CRE and the low resourced areas identified in the CCE?
- How can data users interpret any discrepancies between these two community resilience tools?

## DATA AND METHODS

- Data come from two sources:
  - 2019 Community Resilience Estimates, Equity Supplement
  - 2019 Experimental Community Capacity Estimates
- These estimates are created using:
  - 2019 1-year American Community Survey restricted microdata (for vulnerability/resource indicators)
  - Population Estimates Program (PEP) auxiliary data (for modeling)
  - Small area estimation models (to reduce margins of error)

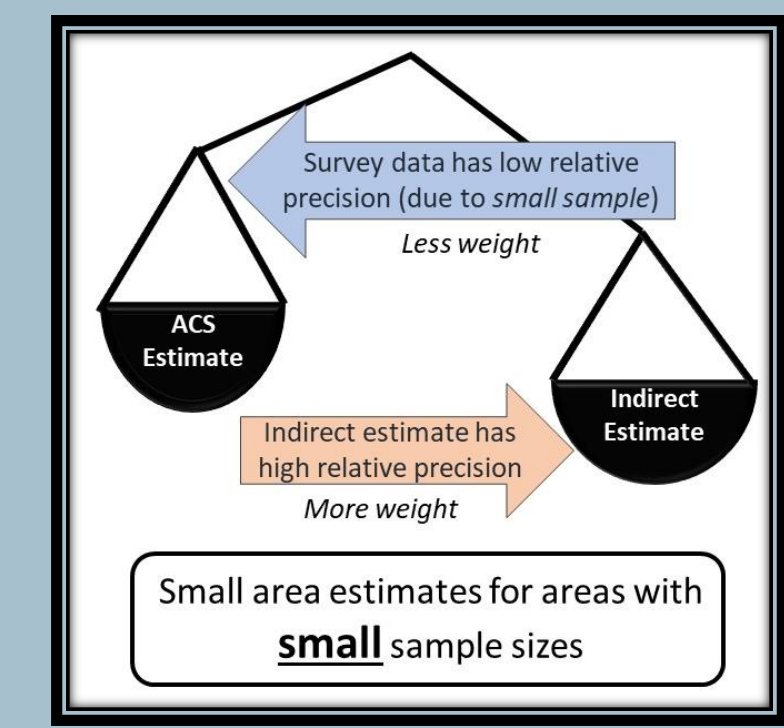
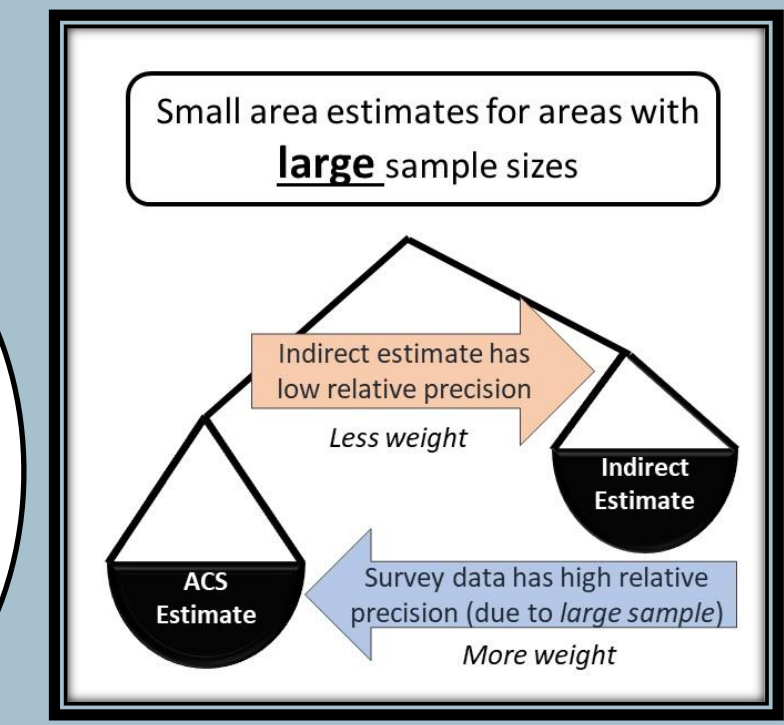


**Step 4.** Create a composite estimate that's weighted based on sample size.

**Step 3.** Create an indirect (modeled) estimate using PEP data.

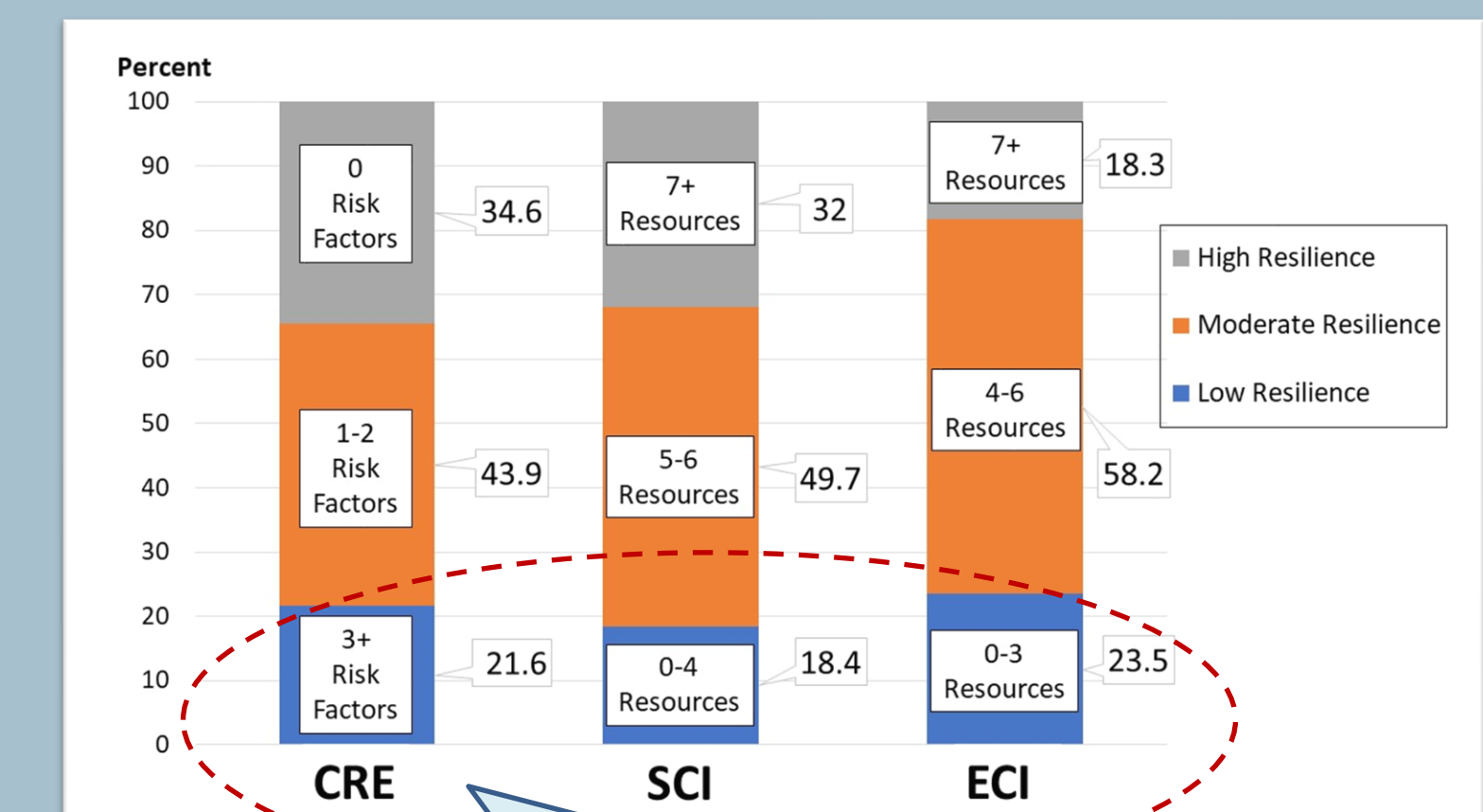
**Step 2.** Aggregate to higher geographic areas, starting with census tract.

**Step 1.** Flag respondents in the ACS based on risk factors.



## ANALYTICAL STRATEGY

- Geographic areas of interest: U.S. counties and census tracts
- Compare correlations and crosstabulations of low resilience groups (CRE: 3+ risk factor group; CCE: low resource group).
  - Using the statistical flags, examine the important discrepancy of areas flagged as vulnerable in CRE but not low resource in CCE.
    - Using logit models, test whether the non-shared ACS indicators found in CRE but not CCE predict this discrepancy.



The low resilience category is the main group of interest for this study.

How do specific ACS variables predict a discrepancy?

Logit Model, Odds Ratios Shown	Absent in...	1= High Vulnerability, Not Low SC	1= High Vulnerability, Not Low EC	1= High Vulnerability, Not Low SC & Not Low EC
	County	Tract	County	Tract
ACS variable in CRE flagged as high				
% age 65+	SCI, ECI	1.7** 1.8***	2.0*** 2.2***	2.0*** 2.1***
% no broadband internet	SCI, ECI	6.2*** 1.4***	6.3*** 1.4***	9.6*** 1.8***
% crowding	SCI, ECI	2.6*** 1.4***	3.0*** 1.2+	3.0*** 1.4**
% below poverty level	SCI	4.2*** 3.3***		
% no health insurance	SCI	1.9*** 2.0***		
% no vehicle access	ECI		2.3*** 1.6***	
% disability	ECI		2.0*** 3.4***	
% no high school degree	ECI		3.0*** 2.1***	
% not speaking English very well	ECI		1.6 1.6***	

Note: Models control for region, rurality, race, and ethnicity. Missing cell indicates a shared indicator across indexes.  
+ p<.10, \* <.05, \*\* p<.01, \*\*\* p<.001

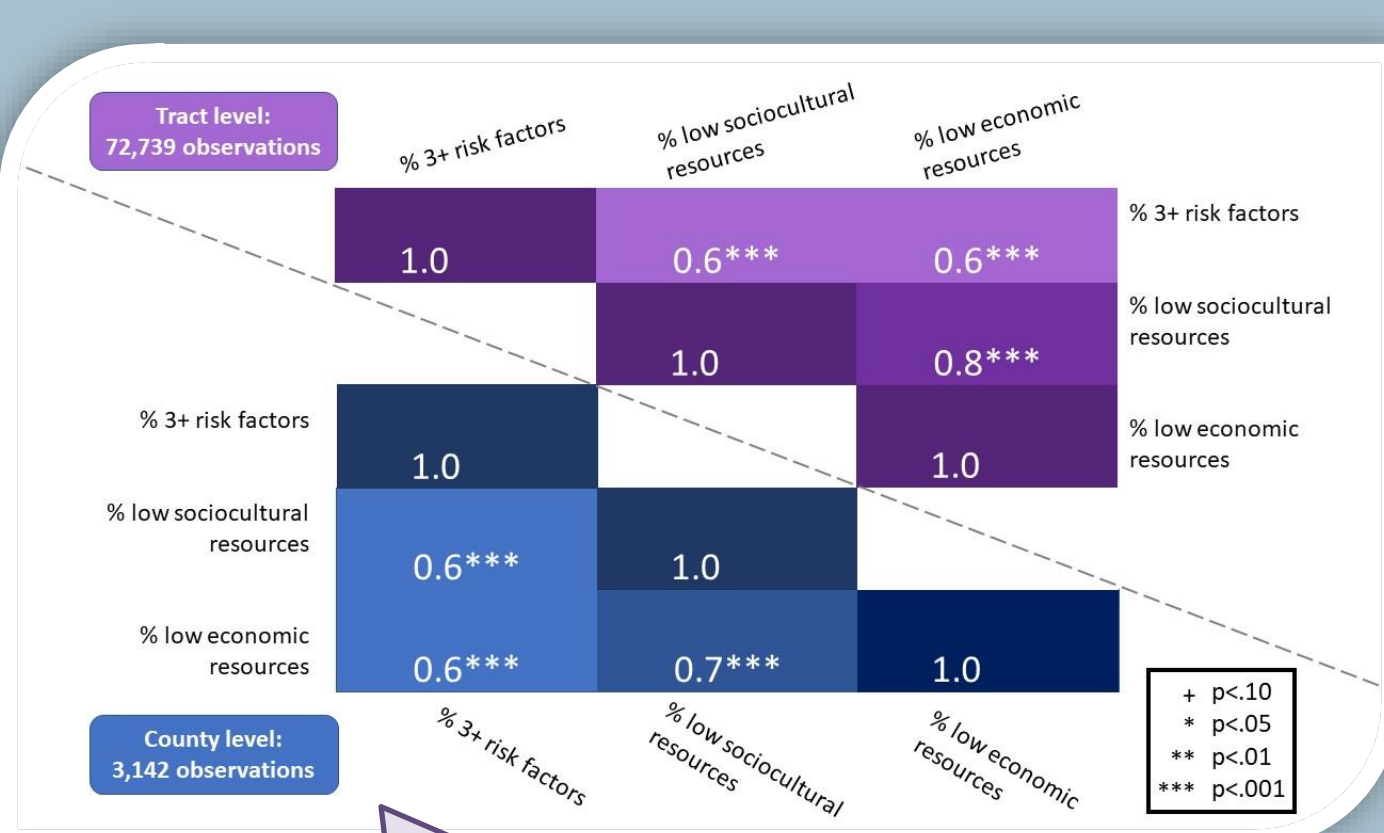
When "% no broadband" is high at the county level, the odds at least quadruple (90% lower bound) that the area will be flagged in CRE but neither SCI/ECI.

A statistically high poverty flag triples the odds it will be flagged in CRE but not SCI.

At the tract level, high disability triples the odds it will be flagged in CRE but not ECI.

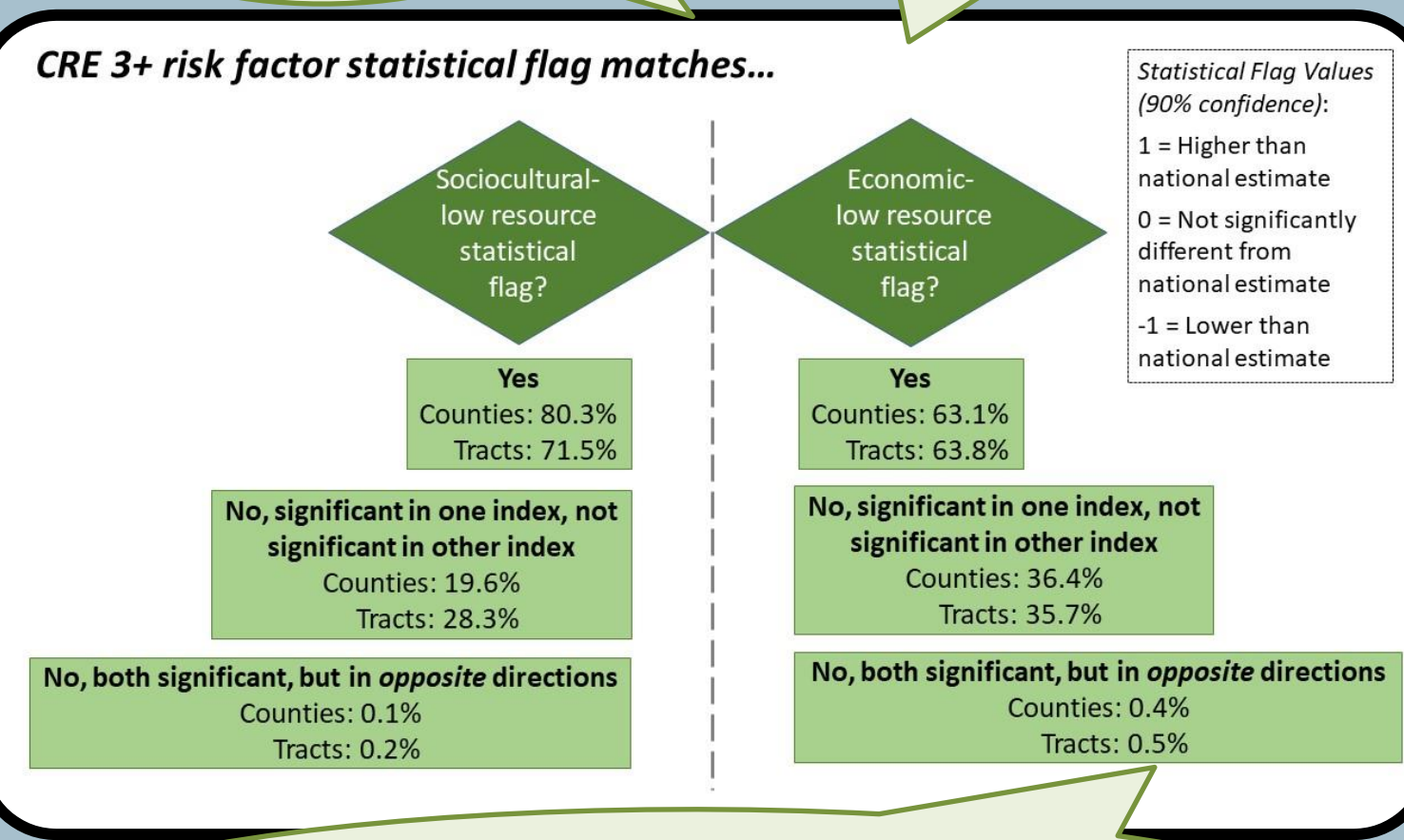
Language is only significant at the tract level.

## RESULTS



When crossing the statistical flags of the estimates (90% CL: 1=high, 0=not sig., -1=low), they line up most of the time.

And when they don't line up, it is generally because one estimate is significant and the other is not.



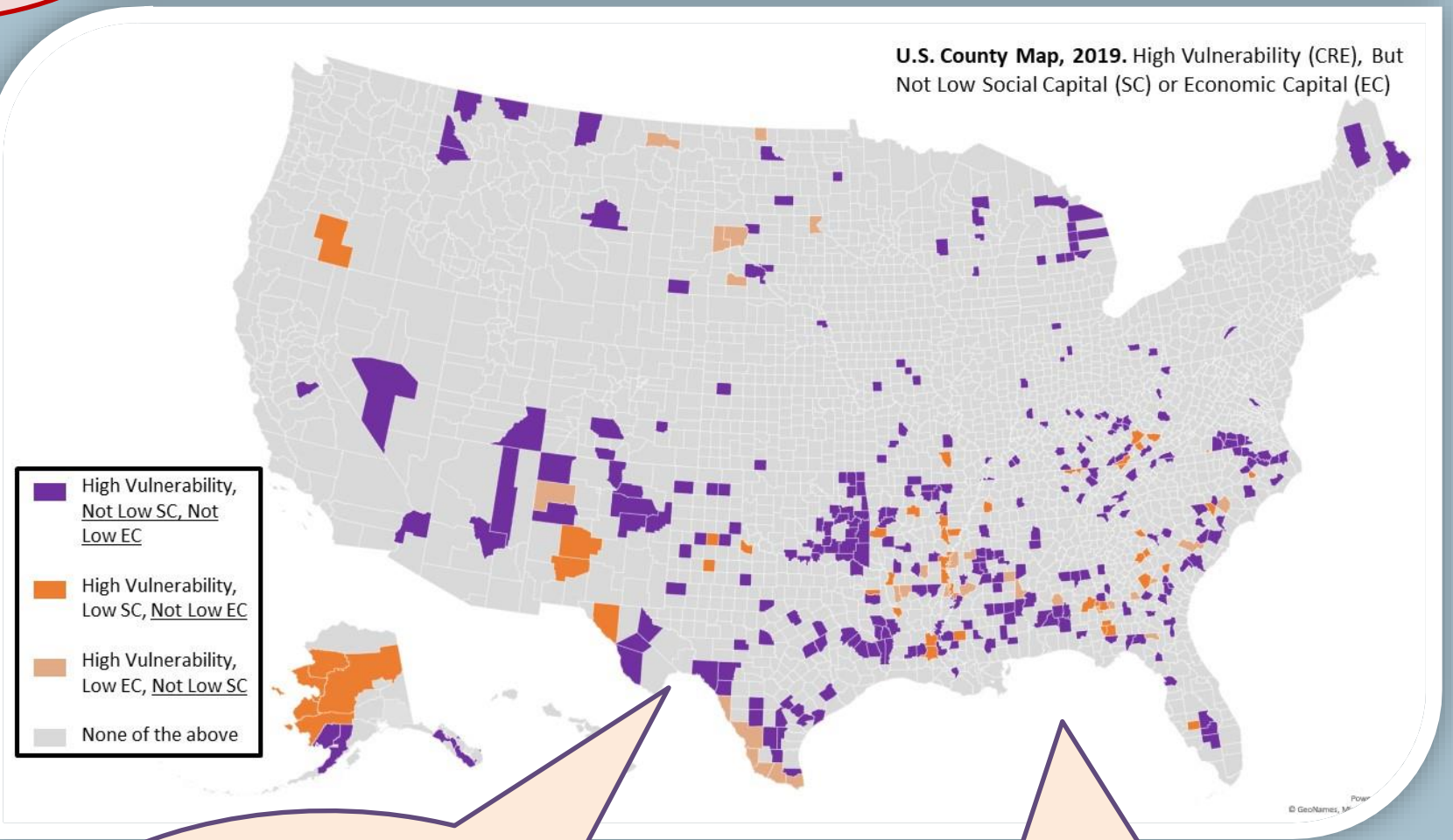
The CRE's 3+ risk factor estimates and the CCE's low resource estimates are significantly correlated at both the county and census tract level (p<.001).

It is RARE (<=0.5%) to find areas flagged in opposite directions (e.g., highly vulnerable/highly resourced), but they exist!

One important type of "mismatch" are areas flagged as highly vulnerable in CRE but not significantly low in resources in CCE (10.1-10.7% of counties, 3.8-4.6% of tracts).

But the ACS variables in CRE for Equity can help!

For counties with this discrepancy (high PRED3, not low ECI), the average number of statistically high ACS variables is 3.8.



High vulnerability/not low SC significantly correlates with high vulnerability/not low EC.

Rurality and living in the South also tend to predict high vulnerability/not low resource mismatches.

**How to Use CRE for Equity to Understand Discrepancies**

Example: County A gets flagged as highly vulnerable (CRE) but not low in economic resources (ECI)

**Step 1:** In CRE for Equity, find the ACS variables that inform the CRE risk index, but absent in ECI

NAME	ACS 5-Year											
	PRED_0	PRED_12	PRED_3	65_PLUS	BROAD_BAND	CROWD_OCC	NO_VEH	DISABL	HS_GRAD	ENG_LVW	BLW_POV_LVL	NO_HEALTH_INS
County A	-1	0	1	1	0	0	1	1	0	0	-1	0

**Step 2:** Using the flag variables (PF), identify which ACS values are statistically high\* (=1)

Statistical Flag Values (90% confidence):  
1 = Higher than national estimate  
0 = Not significantly different from national estimate  
-1 = Lower than national estimate

\*For broadband and high school graduate indicators, it will be low (= -1). These are reverse coded for my analyses.

## SUMMARY

- The CRE high risk estimates and CCE low resource estimates highly correlate with one another. The statistical flags often (but not always!) overlap.
- When discrepancies do occur, the ACS variable flags in the CRE for Equity may help identify a potential reason for the difference.
- Ultimately, data users should use CRE and CCE in conjunction with one another for a holistic understanding of the area's resilience.
  - Focus on the index that best fits the research question or end goal!

Source: 2019 Community Resilience Estimates, Equity Supplement; 2019 Experimental Community Capacity Estimates  
NOTE: The 2019 Experimental Community Capacity Estimates derive from an early test file and subject to change before public release.