Rural - Urban Differences in Community Resilience to COVID-19 in the United States

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Abstract

Background: Individuals with several risk factors are more likely to develop life threatening health complications from COVID-19. However, little is known about rural - urban differences in the portion of the community facing multiple risks.

Purpose: This paper describes rural - urban differences in community resilience using the first nationally representative estimates of community resilience to COVID-19: the U.S. Census Bureau's Community Resilience Estimates (CRE). The CRE are experimental small area estimates produced with restricted microdata from the 2018 American Community Survey (ACS), the Census Bureau's Population Estimates Program, and publicly available health condition rates from the National Health Interview Survey (NHIS). Through small area modeling techniques, the CRE creates more precise estimates in comparison to the use of survey methods alone, especially in rural areas where the survey error is larger.

Methods: This study compares rural and urban county high-risk population rates using the CRE. Individuals are considered high-risk if they have three or more individual indicators associated with vulnerability to the impact of the COVID-19 pandemic: aged 65 and above; low-income household; single or no caregiver household; household communication barrier; employment status; disability status; physical crowding; lack of health insurance; respiratory disease; heart disease; and diabetes. Rural and urban county population high-risk rates are compared at the national-, regional-, divisional- and state-level using t-tests.

Results: T-tests show that across the United States, populations in urban counties are more vulnerable to the impact of the COVID-19 pandemic than rural populations. However, more states have rural populations that are more vulnerable than urban populations. In comparison to urban populations, rural populations are more vulnerable to COVID-19 in Alabama, Arizona, Arkansas, Georgia, Mississippi, North Carolina, South Carolina, Tennessee, Virginia, Washington, and West Virginia. On the other hand, in comparison to rural populations, urban populations are more vulnerable to COVID-19 in Illinois, Nebraska, Nevada, New York, Ohio, and Pennsylvania.

Implications: These findings suggest that it is critical to better identify and address the multiple risks faced by rural communities in the South Region - South Atlantic Division and South Region - East South Central Division of the United States. Furthermore, restricted microdata and small area modeling can help us better identify and understand those most vulnerable to disasters in both rural and urban areas of the United States.

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Rural-Urban Differences in Community Resilience to COVID-19 in the United States

1 | INTRODUCTION

As the highly infectious respiratory disease COVID-19 struck the United States in the spring of 2020, much of the focus on those affected by the COVID-19 pandemic was on large urban cities rather than rural areas. Likewise, research on community resilience, which is the capacity for a community to cope with a natural disaster, predominately focuses on urban rather than rural areas (Cutter, Ash, and Emrich 2016). However, when looking at the prevalence of individual community resilience indicators, it is rural areas that are more vulnerable to COVID-19 (Peters 2020).

Not everyone who catches COVID-19 is at equal risk of facing life-threatening health complications; individuals with multiple risk factors are at a higher risk (Mayo Clinic Staff 2020). While individuals with multiple risks are more likely to face negative impacts, we know little about rural - urban differences in the population facing multiple indicators associated with vulnerability to the COVID-19 pandemic. This gap in knowledge is due to the limited publicly available population tables commonly used in community resilience research and high margins of error associated with rural subgroup analysis. This paper overcomes this limitation by using the U.S. Census Bureau's new Community Resilience Estimates (CRE), which creates more precise estimates by employing small area modeling techniques with public tables and restricted microdata.

This paper is the first to describe rural - urban differences in community resilience using nationally representative estimates of community resilience to COVID-19: the U.S. Census Bureau's new experimental CRE. The purpose of this paper is twofold: (1) To describe how small area estimate techniques, like the CRE, can be used to better identify socially and economically vulnerable populations in rural areas in comparison to direct survey estimates, and (2) To compare rural and urban community resilience to COVID-19. Since findings show rural communities in the South Region - South Atlantic Division and South Region - East South Central Division of the United States are more vulnerable to COVID-19, it is critical to identify and address the underlying risk factors of high-risk residents in these regions. Because it produces more precise community resilience estimates in rural areas than traditional survey methods, small area estimates of community resilience, like CRE, are ideal to understand which places are most vulnerable to disasters like COVID-19.

2 | METHODS

2.1 | Data

2.1.1 | Community Resilience Estimates

2.1.1.1 | Background of Small Area Estimates at Census

Census' American Community Survey (ACS) provides critical economic, housing, and social statistics on rural populations. However, there are many limitations with using the ACS to study rural populations, primarily due to its sample size (the sample size of ACS has consistently been ~2.5 percent of the population over the course of five years). Due to confidentiality requirements, ACS 1-year estimates are not available for counties with populations lower than 65,000. Around 40 percent of all counties in the United States (primarily rural) do not have ACS 1-year estimates available (U.S. Census Bureau 2020). While ACS 5-year estimates are available for all counties across the United States, they provide less timely information and often have large margins of error for estimates with small populations.

Federal funds are increasingly being allocated based on social and economic statistical estimates, which has increased the need for small area methods (National Research Council 2000). When a domain of interest, such as a demographic tabulation for a geographic area, has an insufficient sample-size to make direct survey estimates of adequate precision, it is considered a small area (National Center for Science and Engineering Statistics 2013). Due to the limitations of direct survey estimates of small populations and the demand for timely information about them, Census has established small area methods for estimating key social, economic, and housing statistics, including income, poverty and health insurance status. For example, the Small Area Income and Poverty Estimates (SAIPE) program produces annual child poverty estimates for school districts across the United States, which is used for Title I allocation. Additionally, the Centers for Disease Control and Prevention (CDC)'s National Breast and Cervical Cancer Early Detection Program uses the Census Bureau's Small Area Health Insurance Estimates (SAHIE) program to allocate funds.

Small area estimates are a needed alternative to direct survey estimates because they can produce more consistent and precise estimates in comparison to direct survey estimation alone, especially in sparsely populated areas. By combining survey data with auxiliary population data, it is possible for survey data to "borrow strength" from auxiliary population data and produce more precise estimates than direct survey estimates alone (Rao and Molina 2015). For example, child poverty estimate error is dramatically reduced by combining ACS data with auxiliary data and using small area estimation techniques. In comparison to ACS 2005 direct survey estimates of county poverty, small area modeling produces a 56 percent decline in standard error and gains are the greatest among counties with smaller ACS sample sizes (Bell et al. 2007). Since small area estimates provide increased precision for estimates of small populations, these methods are important to better understand rural populations.

2.1.1.2 | Method of Developing Small Area Estimates of Community Resilience to COVID-19

The first version of the CRE are experimental estimates produced using 2018 ACS micro data, the Census Bureau's 2018 Population Estimates Program (PEP) postcensal population estimates by tract, age group, race and ethnicity, and sex, as well as publicly available health condition rates from the 2018 National Health Interview Survey (NHIS). Once the survey data and auxiliary information is combined, area-level small area model-based techniques are used to reduce estimation variance as described below.

First, 2018 NHIS data on the incidence rate of health conditions by age, sex, race and ethnicity, and region is distributed to 2018 ACS microdata. The incidence rate for three health conditions (serious heart conditions, diabetes, and emphysema or current asthma) is estimated for 120 possible combinations: 3 age groups (less than 18, 18-65, and 65+) by 2 sex groups (male and female), by 5 race and ethnicity groups (Hispanic or Latino, Non-Hispanic White, Non-Hispanic Black, Non-Hispanic Asian, and Non-Hispanic Other) by 4 regions (West, Midwest, South and Northeast).

Then, using the combined 2018 NHIS and ACS microdata, the following eleven individual community resilience indicators are tagged:

1. low income (income-to-poverty ratio is less than 130 percent at the household-level),

2. single caregiver household (households where there is only one or no individuals who are 18-64),
3. crowded (more than 0.75 persons per room in household or household is in a tract where 75 percent of the population is in blocks with greater than 4,000 people per square mile),
4. low communication (linguistically isolated household or household with no one over the age of 16 with a high school diploma),
5. unemployed (no employed persons in household where there are more individuals aged under 65 than 65+),
6. disabled (person has one of any of the six disability types: hearing difficulty, vision difficulty, cognitive difficulty, ambulatory difficulty, self-care difficulty, and independent living difficulty),
7. uninsured (person is uninsured),
8. age (person is older than 65),
9. serious heart condition (person is projected to have a serious heart condition),
10. diabetes (person is projected to have diabetes), and
11. emphysema or current asthma (person is projected to have emphysema or current asthma)

Individuals within the ACS microdata are then described as low-risk (0 community resilience indicators), medium-risk (1-2 community resilience indicators), or high-risk (3 or more community resilience indicators). Next, using traditional direct survey methods, tabulations for states, counties, and tracts for the number of people at low-, medium-, and high-risk are estimated. These traditional direct survey estimates are then used to inform the small area model.

To create the small area estimates, the CRE fits a Fay Herriot model (Fay and Herriot 1979), which is made up of a combination of regression estimation techniques and shrinkage techniques. Traditional direct survey estimates are used as the dependent variable of the regression model used to inform estimates. Using Census' Population Estimates Program (PEP) postcensal population estimates as independent variables, a regression "prediction" is obtained. These regression-based predictions are then combined with direct sample estimates, with each of the two parts receiving a weight and each of the two weights adding up to one. The weight of a model prediction component is the ratio of the sampling variance of the direct estimate to the total variance of the direct estimate. So, when direct survey methods are more precise, the direct survey estimate receives a greater weight; when direct survey methods are less precise, the modeled estimate receives a greater weight. Using this strategy, CRE produces nationally representative estimates of community resilience to COVID-19 with smaller standard errors than direct survey estimates alone. CRE county-level high-risk population rates (https://www2.census.gov/data/experimental-data-products/community-resilience-estimates/2020/cre-2018-a11.csv) were used in this analysis.

2.1.2 | Rural and Urban Classification

Census (2020) defines rural areas as "all population, housing and territory not included within an urban area" and "identifies two types of urban areas: (1) Urbanized Areas (UAs) of 50,000 or more people, and (2) Urban Clusters (UCs) of at least 2,500 and less than 50,000 people." In addition to the population thresholds, since 2010, Census has defined an area as urban using population density criteria, land use, and distance (Ratcliffe, Burd, Holder, and Fields 2016). In short, territory that is not urban is considered rural. Since rurality is based on the level of the Census block, counties can be partially or completely rural. Using U.S. Census Bureau's List of Population, Land Area, and Percent Urban and Rural in 2010 by State and County (https://www2.census.gov/geo/docs/reference/ua/PctUrbanRural_County.xls), I define rural counties as those where a majority of the population live in a rural area. Urban counties are defined as those that are not majority rural.

2.1.3 | Regions and Divisions of the United States

Census partitions the United States into four regions and nine divisions. Census regions and divisions of the United States are displayed in Figure One. The four regions include the Midwest, the Northeast, the South, and the West. The Midwest is made up of two divisions: East North Central, and West North Central. The Northeast is also made up of two divisions: New England, and Middle Atlantic. The South is made up of three divisions: East South Central, South Atlantic, and West South Central. The West is made up of two divisions: Mountain, and Pacific. Except for the addition of Alaska and Hawaii to the West Region – Pacific Division, the nine regional divisions have remained consistent since the 1910 Decennial Census. Using U.S. Census Bureaus Regions and Divisions with State FIPS Codes (https://www2.census.gov/geo/pdfs/maps-data/maps/reference/us_regdiv.pdf), I analyze rural – urban differences at the national-, regional-, divisional-, and state-level

2.2 | Statistical Analysis

To test if resilience to COVID-19 differs between rural and urban counties for a given state, division, region, or nationally, I aggregated the total and high-risk population estimates for rural and urban counties and determined high-risk population rates by dividing the high-risk population estimate by the total population estimate and multiplying by 100. Standard errors for high-risk population aggregates were approximated using the following equation:

$$\mathrm{SE}\left(\hat{X}_1 + \hat{X}_2 + \cdots + \hat{X}_n\right) = \sqrt{\{SE(\hat{X}_1)]^2 + \{SE(\hat{X}_2)]^2 + \cdots + \{SE(\hat{X}_n)]^2}$$

County population estimates are treated as constant for aggregate denominators, so standard errors for high-risk population rates were approximated using the following equation:

$$100 * \mathrm{SE}\left(\frac{\hat{X}_1+\hat{X}_2+\cdots+\hat{X}_n}{\hat{Y}_1+\hat{Y}_2+\cdots+\hat{Y}_n}\right) = \frac{100}{(\hat{Y}_1+\hat{Y}_2+\cdots+\hat{Y}_n)} * \sqrt{\{SE(\hat{X}_1)]^2 + \{SE(\hat{X}_2)]^2 + \cdots + \{SE(\hat{X}_n)]^2}$$

I used t-tests at the 90 percent confidence interval to determine if high-risk population rates were significantly different between rural and urban counties nationally, and within regions, divisions, and states. Five states do not have rural counties (i.e., Connecticut, Delaware, District of Columbia, New Jersey, and Rhode Island) and therefore were excluded from the state-level analysis.

3 | ANALYTIC SAMPLE

Once rural and urban counties were classified, high-risk population rates for counties were examined across the United States, and among regions, divisions, and states within the United States. Rural and urban county high-risk population rate averages were also compared using t-tests at the 90 percent confidence interval. Summary statistics for rural and urban county high-risk population rates at the national-, regional-, and divisional-level are displayed in Table One. Summary statistics for rural and urban county high-risk population rates from all states in the United States and the District of Columbia are displayed in Table Two.

Across the United States, rural counties have a significantly higher average high-risk population rate than urban counties. The average high-risk population rate for rural counties is 26.53 percent (+/- 0.15 percent) and the average high-risk population rate for urban counties is 24.91 percent (+/- 0.18 percent). The high-risk population rate for rural counties ranged from 10.68 percent (+/- 5.53 percent) in Morgan County, Utah to 46.49 percent (+/- 9.58 percent) in Real County, TX. For urban counties, the high-risk population rate ranged from 11.76 percent (+/- 4.74 percent) in Carver County, Minnesota to 48.45 percent (+/- 9.99 percent) in Sumter County, Florida.

Across regions within the United States, rural counties in the Midwest, South, and West have a significantly higher average high-risk rate than urban counties. While in the Northeast, urban counties have a significantly higher average high-risk rate than rural counties. The average high-risk population rate for rural counties ranged from 23.17 percent (+/- 0.56 percent) in the Northeast to 29.13 percent (+/- 0.23 percent) in the South. The average high-risk population rate for urban counties ranged from 22.87 percent (+/- 0.32 percent) in the Midwest to 26.54 percent (+/- 0.29 percent) in the South.

Across divisions within the United States, rural counties in the Midwest Region – East North Central Division, Midwest Region – West North Central Division, South Region – South Atlantic Division, South Region – East South Central Division, South Region – West South Central Division, and West Region – Mountain Division have a significantly higher average high-risk rate than urban counties. While in Northeast Region – Middle Atlantic Division, urban counties have a significantly higher average high-risk rate than rural counties. There was no difference between rural and urban county average high-risk rates in Northeast Region – New England Division or West Region – Pacific Division. The average high-risk population rate for rural counties ranged from 22.05 percent (+/- 0.93 percent) in Northeast Region – New England Division to 29.49 percent (+/- 0.43 percent) in the South Region – West South Central Division. The average high-risk population rate for urban counties ranged from 22.24 percent (+/- 1.06 percent) in Northeast Region – New England Division to 28.34 percent (+/- 0.52 percent) in South Region – West South Central Division.

Across states within the United States, rural counties in Alabama Alaska, Arizona, Arkansas, Georgia, Kentucky, Louisiana, Michigan, Minnesota, Mississippi, Missouri, New Hampshire, New Mexico, North Carolina, North Dakota, Oklahoma, South Carolina, South Dakota, Tennessee, Utah, Virginia, Washington, West Virginia and Wisconsin have a significantly higher average high-risk rate than urban counties. While in New York, urban counties have a significantly higher average high-risk rate than rural counties. There was no difference between rural and urban county average high-risk rates in California, Colorado, Connecticut, Delaware, the District of Columbia, Florida, Hawaii, Idaho, Illinois, Indiana, Iowa, Kansas, Maine, Maryland, Massachusetts, Montana, Nebraska, Nevada, New Jersey, Ohio, Oregon, Pennsylvania, Rhode Island, Texas, Vermont, and Wyoming. The average high-risk population rate for rural counties ranged from 20.67 percent (+/- 1.53 percent) in Vermont to 39.78 percent (+/- 3.77 percent) in Arizona. The average high-risk population rate for urban counties ranged from 17.51 percent (+/- 3.08 percent) in New Hampshire to 31.44 percent (+/- 7.75 percent) in the District of Columbia.

4 | STATISTICAL ANALYSIS RESULTS

Rural and urban high-risk population rates are compared across the United States, and among regions, divisions, and states within the United States. The results of urban and rural high-risk population rate comparisons for the entire United States and among regions and divisions of the United States are displayed in Table Three. State-level rural and urban county comparison results are displayed in Table Four. Figure Two displays a map of state-level rural and urban county high-risk population rate results. Figure Three displays the percent difference between rural and urban high-risk population rates across states.

When analyzing the difference in high-risk population rates in rural and urban counties across the United States, I find that urban populations have a greater portion of residents at high-risk than rural residents. However, rural and urban differences in high-risk population rates are not consistent across regions, divisions or states. When analyzing the difference in high-risk population rates in rural and urban counties across regions in the United States, I find that the Midwest and Northeast have higher high-risk population rates in urban areas in comparison to rural areas, but there is no significant difference between rural and urban populations in the South and West.

When analyzing rural – urban differences across divisions, I find that high-risk population rates are higher in urban areas in Midwest Region – East North Central Division, Northeast Region – New England Division, and Northeast Region – Middle Atlantic Division. On the other hand, high-risk population rates are higher in rural areas in the South Region – South Atlantic Division and South Region – East South Central Division. There was no significant difference between rural and urban high-risk population rates in Midwest Region – North Central Division, Midwest Region – West South Central Division, West Region – Mountain Division, and West Region – Pacific Division.

When analyzing the difference in high-risk population rates in rural and urban counties across states, I find that when there is a significant rural-urban difference, rural populations are more high-risk to COVID-19 in a majority of states. Eleven states have rural populations with a greater portion of residents at high-risk to COVID-19 than urban residents: Alabama, Arizona, Arkansas, Georgia, Mississippi North Carolina, South Carolina, Tennessee, Virginia, Washington and West Virginia. Six states have urban populations with a greater portion of residents at high-risk than rural residents: Illinois, Nebraska, Nevada, New York, Ohio, and Pennsylvania. There was no significant difference between rural and urban high-risk population rates in the remaining thirty-four states: Alaska, California, Colorado, Connecticut, Delaware, District of Columbia, Foorida, Hawaii, Idaho, Indiana, Iowa, Kansas, Kentucky, Louisiana, Maine, Maryland, Massachusetts, Michigan, Minnesota, Missouri, Montana, New Hampshire, New Jersey, New Mexico, North Dakota, Oklahoma, Oregon, Rhode Island, South Dakota, Texas, Utah, Vermont, Wisconsin, and Wyoming.

5 | DISCUSSION

Vulnerability to the COVID-19 pandemic in rural America isn't the same across regions, divisions, and states. Figure Four displays a map of rural and urban counties with high-risk population rates greater than the national high-risk population rate of 26.52 percent (+/- 0.42 percent). The geographic concentration of high-risk counties displays similarities to that of commonly studied distressed regions of the United States (Glasmeir 2005; Hotez 2008; Holt 2007; Wood 2005). For example, high-risk populations are located in the Great Lakes region, and areas commonly associated with the Great Continental Poverty Divide: Tribal Lands in New Mexico and Arizona, the Border Region in Texas, and the Mississippi Delta and Cotton Belt areas in the South. However, while Southern Florida is not a commonly studied distressed area, it has a large portion of its population at high-risk. I believe this is because the individual indicators associated with vulnerability to COVID-19 creating high-risk in the area are associated with old age, not social and economic distress.

This research shows that rural communities in the South Region – South Atlantic Division, and South Region – East South Central Division have a significantly greater portion of residents at high-risk to COVID-19 in comparison to urban communities. On the other hand, rural communities in the Northeast Region have a significantly smaller portion of residents at high-risk to COVID-19 in comparison to urban communities. This finding aligns with previous research on regional rural-urban inequality differences across the United States (Iceland and Hernandez 2017; Levinger, Partridge and Rickman 1998; Thiede, Butler, Brown, and Jensen 2020). Because of the racial makeup and historical development of rural areas in the South, rural communities have higher levels of inequality. On the other hand, due to the racial makeup and historical development of rural areas in the Northeast, rural communities are less distressed. In line with this prior research, this paper demonstrates how communities in the rural South are more disadvantaged in comparison to urban communities, while rural communities in the Northeast are less disadvantaged than urban communities.

While across the United States, rural county average high-risk rates are significantly greater than urban county averages, but urban populations have a greater high-risk population rate than rural populations. This is because, even among rural counties, rural high-risk populations are located in less populated areas. Additionally, rural areas in the Cotton Belt, particularly those in South Region – South Atlantic Division and South Region – East South Central Division of the United States, are most vulnerable to the COVID-19 pandemic. These findings suggest that it is critical to better identify and address the multiple risks faced by rural communities in less populated areas, South Region – South Atlantic Division, and South Region – East South Central Division of the United States.

This research shows estimates of community resilience based on intersecting individual community resilience indicators, but it does not provide insight on the individual indicators affecting community resilience. Further research on rural-urban differences in community resilience would be advanced through the development of small area estimates of individual community resilience indicators. Through small area modeling of individual risk factors, we could better identify the issues facing low populated counties that are most at risk. The advancement of small area estimates of community resilience is critical to better understand rural-urban inequality.

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Tables and Figures

Table One: National, Regional, and Divisional Summary Statistics for Rural and Urban County High-Risk Population Rates

	Rural						Urban					
	Freq.	% High-Risk: Mean	Std.Dev.	Min.	Median	Max	Freq.	% High-Risk: Mean	Std.Dev.	Min.	Median	Max
US	***1,883***	***26.53% (+/- 0.15%)***	***4.97%***	***10.68%***	***26.34%***	***46.49%***	***1,257***	***24.91% (+/- 0.18%)***	***5.01%***	***11.76%***	***24.60%***	***48.45%***
Midwest	**682**	**23.93% (+/- 0.24%)***	**4.07%**	**13.51%**	**23.48%**	**45.15%**	**372**	**22.87% (+/- 0.32%)**	**3.91%**	**11.76%**	**22.97%**	**39.31%**
East North Central	251	23.75% (+/- 0.35%)*	3.51%	14.20%	23.51%	37.59%	186	22.90% (+/- 0.43%)	3.81%	13.11%	22.97%	35.02%
West North Central	431	24.04% (+/- 0.31%)*	4.36%	13.51%	23.43%	45.15%	186	22.83% (+/- 0.46%)	4.02%	11.76%	22.93%	39.31%
Northeast	**96**	**23.17% (+/- 0.56%)**	**2.66%**	**16.11%**	**23.22%**	**35.39%**	**121**	**24.76% (+/- 0.57%)***	**4.92%**	**15.86%**	**24.60%**	**41.97%**
Middle Atlantic	61	23.82% (+/- 0.69%)	2.51%	19.52%	23.96%	35.39%	89	25.67% (+/- 0.67%)*	4.83%	16.62%	26.09%	41.97%
New England	35	22.05% (+/- 0.93%)	2.58%	16.11%	21.73%	27.08%	32	22.24% (+/- 1.06%)	4.32%	15.86%	21.18%	32.57%
South	**903**	**29.13% (+/- 0.23%)***	**4.23%**	**16.44%**	**28.88%**	**46.49%**	**519**	**26.54% (+/- 0.29%)**	**5.28%**	**13.58%**	**26.29%**	**48.45%**
East South Central	271	28.96% (+/- 0.42%)*	3.77%	19.29%	28.78%	39.84%	93	25.65% (+/- 0.66%)	4.68%	14.67%	25.51%	40.97%
South Atlantic	351	28.97% (+/- 0.37%)*	4.67%	16.44%	28.76%	45.36%	237	25.45% (+/- 0.42%)	5.25%	13.58%	25.43%	48.45%
West South Central	281	29.49% (+/- 0.43%)*	4.05%	19.08%	29.32%	46.49%	189	28.34% (+/- 0.52%)	5.13%	18.60%	27.63%	44.17%
West	**202**	**25.30% (+/- 0.50%)***	**5.58%**	**10.68%**	**24.99%**	**43.30%**	**245**	**24.63% (+/- 0.41%)**	**4.75%**	**13.85%**	**24.62%**	**39.16%**
Mountain	145	25.09% (+/- 0.60%)*	5.75%	10.68%	24.69%	43.30%	136	24.09% (+/- 0.56%)	5.52%	13.85%	23.49%	39.16%
Pacific	57	25.83% (+/- 0.91%)*	5.15%	15.51%	25.52%	37.24%	109	25.31% (+/- 0.61%)	3.48%	15.33%	25.72%	34.93%

* in a rural - urban comparison, counties have a significantly higher average high-risk rate based on a 90% confidence interval
Source: U.S. Census Bureau 2018 Community Resilience Estimates linked to U.S. Census Bureau's List of Population, Land Area, and Percent Urban and Rural in 2010

Table Two: State Summary Statistics for Rural and Urban County High-Risk Population Rates

	Rural						Urban					
State	Freq.	% High-Risk: Mean	Std.Dev.	Min.	Median	Max	Freq.	% High-Risk: Mean	Std.Dev.	Min.	Median	Max
AL	48	30.88% (+/- 0.99%)*	3.76%	22.42%	30.80%	39.38%	19	26.08% (+/- 1.44%)	3.17%	20.32%	26.29%	32.31%
AK	22	22.78% (+/- 1.39%)*	5.44%	15.51%	21.67%	37.24%	6	19.67% (+/- 2.50%)	4.04%	15.33%	19.59%	26.16%
AZ	3	39.78% (+/- 3.77%)*	6.04%	32.81%	43.23%	43.30%	12	29.43% (+/- 1.91%)	3.41%	23.51%	29.54%	34.21%
AR	56	29.44% (+/- 0.90%)*	3.09%	23.91%	29.25%	36.66%	19	26.38% (+/- 1.48%)	4.16%	19.86%	27.03%	33.24%
CA	11	27.98% (+/- 2.15%)	2.94%	24.06%	27.53%	32.71%	47	26.65% (+/- 0.97%)	2.69%	20.20%	26.47%	34.93%
CO	34	23.97% (+/- 1.26%)	4.90%	14.76%	24.11%	33.82%	30	23.41% (+/- 1.22%)	4.55%	14.01%	23.38%	34.68%
CT	0	-	-	-	-	-	8	21.62% (+/- 2.06%)	3.40%	16.10%	20.76%	26.00%
DE	0	-	-	-	-	-	3	27.27% (+/- 3.55%)	3.30%	24.06%	27.08%	30.66%
DC	0	-	-	-	-	-	1	31.44% (+/- 7.75%)	-	31.44%	31.44%	31.44%
FL	25	30.27% (+/- 1.36%)	4.42%	24.88%	30.04%	45.19%	42	30.22% (+/- 1.04%)	5.89%	19.11%	29.46%	48.45%
GA	108	29.42% (+/- 0.69%)*	5.21%	16.44%	28.75%	44.71%	51	23.32% (+/- 0.86%)	4.68%	13.58%	23.72%	32.80%
HI	1	35.23% (+/- 11.59%)	-	35.23%	35.23%	35.23%	4	24.15% (+/- 3.07%)	2.33%	20.79%	24.80%	26.19%
ID	28	23.66% (+/- 1.25%)	4.18%	16.63%	23.86%	32.56%	16	21.99% (+/- 1.56%)	3.52%	15.01%	21.58%	30.26%
IL	52	23.79% (+/- 0.83%)	2.77%	18.45%	23.61%	29.76%	50	23.66% (+/- 0.86%)	3.56%	13.41%	23.74%	33.71%
IN	54	22.13% (+/- 0.78%)	1.96%	18.03%	22.24%	27.52%	38	22.37% (+/- 0.95%)	4.03%	13.11%	23.10%	29.43%
IA	68	22.13% (+/- 0.71%)	2.82%	16.97%	21.51%	31.24%	31	22.62% (+/- 1.10%)	2.76%	15.12%	22.98%	27.96%
KS	67	24.40% (+/- 0.83%)	4.20%	16.50%	24.18%	37.49%	38	23.31% (+/- 1.11%)	3.37%	15.90%	24.12%	30.07%
KY	92	27.24% (+/- 0.71%)*	3.40%	19.29%	27.21%	37.79%	28	23.63% (+/- 1.18%)	3.25%	15.48%	23.30%	29.59%
LA	33	29.67% (+/- 1.18%)*	3.99%	21.72%	29.76%	37.52%	31	26.84% (+/- 1.20%)	5.58%	18.60%	25.61%	39.45%
ME	14	23.43% (+/- 1.47%)	2.43%	18.99%	23.48%	27.08%	2	21.74% (+/- 4.02%)	1.03%	21.01%	21.74%	22.46%
MD	7	25.52% (+/- 2.30%)	5.47%	18.61%	24.89%	31.79%	17	24.20% (+/- 1.56%)	5.29%	16.82%	24.93%	36.98%
MA	1	22.02% (+/- 5.36%)	-	22.02%	22.02%	22.02%	13	23.64% (+/- 1.74%)	4.77%	15.86%	22.99%	32.57%
MI	56	25.95% (+/- 0.74%)*	4.44%	17.20%	25.44%	37.59%	27	23.50% (+/- 1.12%)	3.69%	16.77%	23.63%	35.02%
MN	56	22.46% (+/- 0.70%)*	3.17%	15.44%	22.23%	30.98%	31	20.60% (+/- 1.01%)	4.56%	11.76%	20.85%	31.25%
MS	61	30.82% (+/- 0.91%)*	4.00%	21.02%	30.47%	39.84%	21	28.90% (+/- 1.48%)	6.19%	19.86%	27.37%	40.97%
MO	83	24.98% (+/- 0.65%)*	4.15%	18.01%	24.50%	38.13%	32	23.08% (+/- 1.03%)	5.08%	15.11%	22.58%	39.31%
MT	40	25.36% (+/- 1.18%)	4.68%	17.35%	25.00%	37.70%	16	23.95% (+/- 1.63%)	4.81%	17.90%	23.07%	31.88%
NE	69	24.24% (+/- 0.86%)	4.20%	17.80%	23.90%	36.47%	24	25.03% (+/- 1.38%)	3.63%	18.03%	25.29%	32.61%
NV	6	25.53% (+/- 3.45%)	5.50%	20.83%	24.43%	35.76%	11	26.05% (+/- 2.09%)	5.05%	18.10%	26.22%	32.71%
NH	7	21.85% (+/- 2.03%)*	2.77%	18.94%	20.81%	25.83%	3	17.82% (+/- 3.08%)	1.94%	16.56%	16.85%	20.05%
NJ	0	-	-	-	-	-	21	25.17% (+/- 1.44%)	5.37%	16.62%	26.98%	34.12%
NM	12	32.69% (+/- 2.34%)*	4.78%	25.56%	32.98%	40.73%	21	29.16% (+/- 1.55%)	5.01%	18.53%	29.97%	39.16%
NY	31	23.26% (+/- 1.00%)	1.91%	19.52%	23.97%	27.31%	31	26.40% (+/- 1.18%)*	5.56%	16.64%	26.02%	41.97%
NC	64	29.66% (+/- 0.82%)*	4.39%	21.13%	29.62%	45.36%	36	24.56% (+/- 0.99%)	3.98%	16.91%	24.22%	32.40%
ND	42	24.84% (+/- 1.10%)*	3.96%	17.83%	24.98%	33.97%	11	22.20% (+/- 2.00%)	3.18%	16.55%	22.98%	28.15%
OH	43	22.94% (+/- 0.84%)	3.15%	15.72%	22.58%	31.44%	45	22.82% (+/- 0.87%)	4.05%	13.66%	23.34%	33.35%
OK	56	28.38% (+/- 0.83%)*	3.58%	21.62%	28.08%	35.52%	21	26.14% (+/- 1.39%)	3.37%	19.66%	25.82%	33.09%
OR	9	27.78% (+/- 2.39%)	4.35%	22.19%	26.45%	35.69%	27	25.52% (+/- 1.19%)	2.86%	19.76%	25.83%	30.62%
PA	30	24.39% (+/- 0.96%)	2.93%	20.44%	23.87%	35.39%	37	25.34% (+/- 0.99%)	3.80%	18.38%	26.09%	39.10%
RI	0	-	-	-	-	-	5	23.23% (+/- 2.80%)	5.21%	18.91%	20.88%	32.00%
SC	28	30.37% (+/- 1.29%)*	3.83%	23.33%	29.31%	44.04%	18	24.60% (+/- 1.40%)	3.77%	19.30%	23.80%	33.57%
SD	46	25.55% (+/- 1.05%)*	6.77%	13.51%	23.50%	45.15%	19	23.05% (+/- 1.56%)	3.49%	15.29%	23.80%	30.12%
TN	70	28.28% (+/- 0.79%)*	2.62%	21.24%	28.54%	34.44%	25	24.87% (+/- 1.24%)	4.22%	14.67%	24.56%	31.66%
TX	136	29.93% (+/- 0.66%)	4.51%	19.08%	29.87%	46.49%	118	29.44% (+/- 0.68%)	5.13%	18.67%	28.86%	44.17%
UT	13	21.94% (+/- 1.88%)*	5.92%	10.68%	20.93%	31.62%	16	17.51% (+/- 1.37%)	3.17%	13.85%	16.49%	24.65%
VT	13	20.67% (+/- 1.53%)	2.09%	16.11%	21.36%	22.46%	1	18.31% (+/- 5.47%)	-	18.31%	18.31%	18.31%
VA	79	27.94% (+/- 0.77%)*	4.72%	17.92%	27.70%	44.62%	54	24.81% (+/- 0.95%)	4.81%	13.68%	24.31%	34.70%
WA	14	26.98% (+/- 1.73%)*	4.18%	21.33%	25.28%	34.68%	25	24.08% (+/- 1.23%)	3.80%	17.87%	23.97%	33.47%
WV	40	27.55% (+/- 1.06%)*	2.97%	20.12%	27.67%	36.53%	15	25.46% (+/- 1.61%)	3.54%	18.17%	26.02%	30.29%
WI	46	23.68% (+/- 0.75%)*	3.47%	14.20%	23.84%	31.15%	26	21.72% (+/- 1.10%)	3.44%	17.58%	20.83%	33.19%
WY	9	21.87% (+/- 2.26%)	3.16%	18.03%	22.69%	27.30%	14	21.86% (+/- 1.73%)	3.65%	15.56%	21.89%	29.12%

* in a rural - urban comparison, counties have a significantly higher average high-risk rate based on a 90% confidence interval

Source: U.S. Census Bureau 2018 Community Resilience Estimates linked to U.S. Census Bureau's List of Population, Land Area, and Percent Urban and Rural in 2010

Table Three: National, Regional, and Divisional High-Risk Population Rate for Rural and Urban Counties

	Rural			Urban		
	Universe Population	# High-Risk	% High-Risk	Universe Population	# High-Risk	% High-Risk
US	***41,162,919***	***10,577,406 (+/- 76,535)***	***25.70% (+/- 0.19%)***	***280,971,275***	***74,847,076 (+/- 1,357,805)***	***26.64% (+/- 0.48%)****
Midwest	**11,774,512**	**2,683,425 (+/- 33,197)**	**22.79% (+/- 0.28%)**	**55,465,063**	**13,767,164 (+/- 514,445)**	**24.82% (+/- 0.93%)***
East North Central	6,964,190	1,584,514 (+/- 28,021)	22.75% (+/- 0.40%)	39,241,032	10,046,207 (+/- 490,552)	25.17% (+/- 1.06%)*
West North Central	4,810,322	1,098,911 (+/- 17,801)	22.84% (+/- 0.37%)	16,224,031	3,720,957 (+/- 154,959)	22.91% (+/- 0.74%)
Northeast	**4,932,539**	**1,121,238 (+/- 31,958)**	**22.73% (+/- 0.65%)**	**50,138,726**	**13,817,641 (+/- 488,166)**	**27.56% (+/- 0.97%)***
Middle Atlantic	3,001,198	703,684 (+/- 23,164)	23.45% (+/- 0.77%)	37,557,597	10,790,099 (+/- 449,288)	28.34% (+/- 1.11%)*
New England	1,931,341	417,554 (+/- 22,017)	21.62% (+/- 1.14%)	12,581,129	3,027,542 (+/- 190,909)	23.74% (+/- 1.32%)*
South	**21,717,435**	**6,071,672 (+/- 58,140)**	**27.96% (+/- 0.27%)**	**101,030,972**	**27,561,674 (+/- 671,725)**	**27.28% (+/- 0.66%)**
East South Central	6,433,810	1,813,840 (+/- 30,295)	28.19% (+/- 0.47%)*	12,339,631	3,115,210 (+/- 133,461)	26.26% (+/- 0.73%)
South Atlantic	9,463,457	2,614,087 (+/- 40,424)	27.62% (+/- 0.43%)*	54,819,707	14,550,441 (+/- 431,446)	26.70% (+/- 0.67%)
West South Central	5,820,168	1,643,745 (+/- 28,781)	28.24% (+/- 0.49%)	33,871,634	9,896,023 (+/- 497,249)	29.07% (+/- 1.25%)
West	**2,738,433**	**701,071 (+/- 18,815)**	**25.60% (+/- 0.69%)**	**74,336,514**	**19,700,597 (+/- 943,111)**	**26.50% (+/- 1.27%)**
Mountain	1,726,511	448,664 (+/- 14,491)	25.99% (+/- 0.84%)	22,503,706	5,872,329 (+/- 377,933)	26.09% (+/- 1.56%)
Pacific	1,011,922	252,407 (+/- 12,000)	24.94% (+/- 1.19%)	51,832,808	13,828,268 (+/- 864,075)	26.65% (+/- 1.64%)

* in a rural - urban comparison, the population has a significantly higher high-risk rate based on a 90% confidence interval

Source: U.S. Census Bureau 2018 Community Resilience Estimates linked to U.S. Census Bureau's List of Population, Land Area, and Percent Urban and Rural in 2010 interval

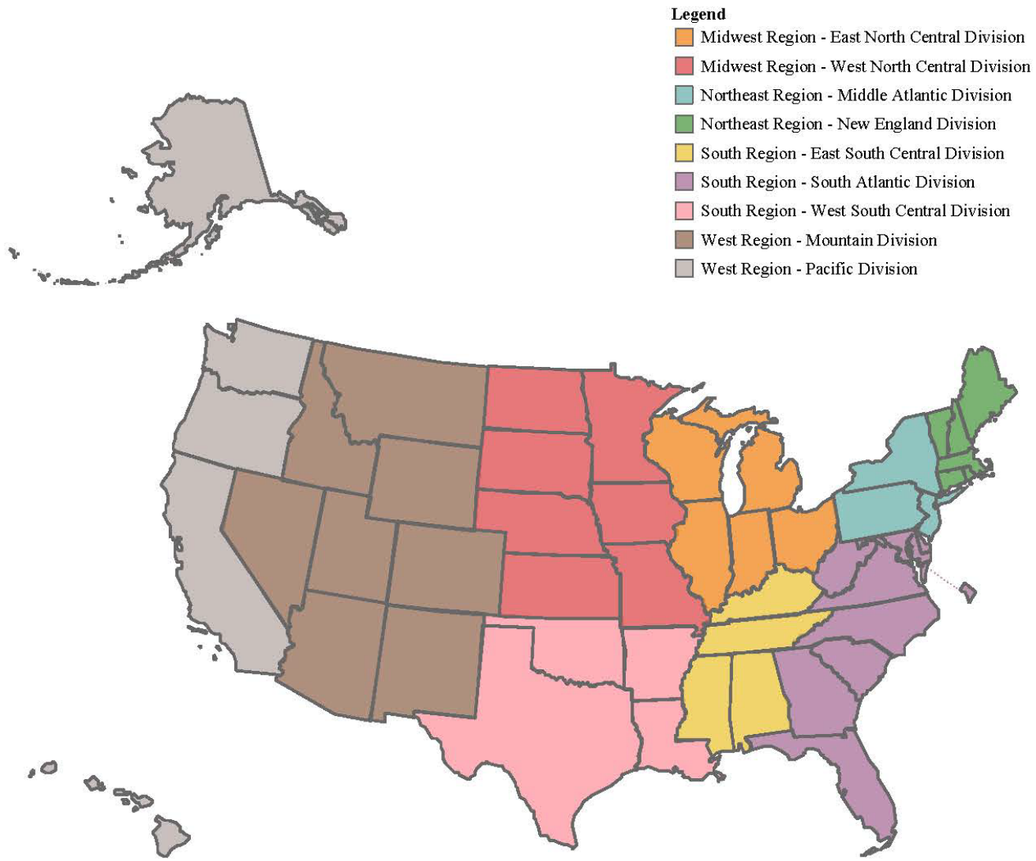
Table Four: State High-Risk Population Rate for Rural and Urban Counties

	Rural			Urban		
State	Universe	# High-Risk	% High-Risk	Universe	# High-Risk	% High-Risk
AL	1,560,873	449,544 (+/- 17,148)	28.80% (+/- 1.10%)*	3,246,257	836,701 (+/- 63,755)	25.77% (+/- 1.96%)
AK	267,728	54,443 (+/- 5,985)	20.34% (+/- 2.24%)	463,333	92,367 (+/- 19,035)	19.94% (+/- 4.11%)
AZ	200,959	75,574 (+/- 7,975)	37.61% (+/- 3.97%)*	6,856,847	1,994,272 (+/- 306,464)	29.08% (+/- 4.47%)
AR	1,104,158	315,170 (+/- 11,094)	28.54% (+/- 1.00%)*	1,852,243	452,699 (+/- 37,103)	24.44% (+/- 2.00%)
CA	271,893	74,233 (+/- 6,389)	27.30% (+/- 2.35%)	38,830,946	10,772,705 (+/- 841,968)	27.74% (+/- 2.17%)
CO	344,598	77,599 (+/- 5,300)	22.52% (+/- 1.54%)	5,272,924	1,279,105 (+/- 104,990)	24.26% (+/- 1.99%)
CT	0	-	-	3,503,307	837,206 (+/- 100,774)	23.90% (+/- 2.88%)
DE	0	-	-	949,521	259,980 (+/- 40,268)	27.38% (+/- 4.24%)
DC	0	-	-	674,513	212,089 (+/- 52,289)	31.44% (+/- 7.75%)
FL	663,343	195,867 (+/- 10,352)	29.53% (+/- 1.56%)	20,365,506	6,408,758 (+/- 350,293)	31.47% (+/- 1.72%)
GA	1,999,476	549,982 (+/- 14,763)	27.51% (+/- 0.74%)*	8,325,284	1,817,250 (+/- 117,893)	21.83% (+/- 1.42%)
HI	88	31 (+/- 10)	35.23% (+/- 11.59%)	1,405,663	359,209 (+/- 66,900)	25.55% (+/- 4.76%)
ID	357,121	82,502 (+/- 5,195)	23.10% (+/- 1.45%)	1,376,619	290,122 (+/- 33,708)	21.07% (+/- 2.45%)
IL	859,773	198,564 (+/- 7,917)	23.09% (+/- 0.92%)	11,716,533	3,272,013 (+/- 411,605)	27.93% (+/- 3.51%)*
IN	1,323,382	290,675 (+/- 10,904)	21.96% (+/- 0.82%)	5,240,060	1,205,861 (+/- 85,385)	23.01% (+/- 1.63%)
IA	930,618	200,590 (+/- 7,100)	21.55% (+/- 0.76%)	2,163,036	483,262 (+/- 38,275)	22.34% (+/- 1.77%)
KS	462,208	104,170 (+/- 4,457)	22.54% (+/- 0.96%)	2,402,252	554,925 (+/- 53,023)	23.10% (+/- 2.21%)
KY	1,660,956	448,019 (+/- 13,162)	26.97% (+/- 0.79%)	2,723,517	679,660 (+/- 61,115)	24.96% (+/- 2.24%)
LA	764,496	219,255 (+/- 9,860)	28.68% (+/- 1.29%)	3,808,240	1,059,732 (+/- 68,125)	27.83% (+/- 1.79%)
ME	924,363	207,441 (+/- 17,141)	22.44% (+/- 1.85%)	393,761	84,268 (+/- 17,316)	21.40% (+/- 4.40%)
MD	309,949	72,182 (+/- 7,743)	23.29% (+/- 2.50%)	5,645,190	1,467,922 (+/- 132,331)	26.00% (+/- 2.34%)
MA	70,673	15,563 (+/- 3,791)	22.02% (+/- 5.36%)	6,656,325	1,640,289 (+/- 151,204)	24.64% (+/- 2.27%)
MI	1,821,742	429,043 (+/- 15,489)	23.55% (+/- 0.85%)	8,033,316	2,056,878 (+/- 175,609)	25.60% (+/- 2.19%)
MN	1,060,245	232,358 (+/- 8,728)	21.92% (+/- 0.82%)	4,481,451	958,614 (+/- 95,414)	21.39% (+/- 2.13%)
MS	1,248,463	370,161 (+/- 12,324)	29.65% (+/- 0.99%)*	1,668,873	431,675 (+/- 30,289)	25.87% (+/- 1.81%)
MO	1,575,620	376,694 (+/- 12,100)	23.91% (+/- 0.77%)	4,451,197	1,060,178 (+/- 90,095)	23.82% (+/- 2.02%)
MT	369,108	92,157 (+/- 6,817)	24.97% (+/- 1.85%)	678,347	152,690 (+/- 15,156)	22.51% (+/- 2.23%)
NE	374,331	84,741 (+/- 3,568)	22.64% (+/- 0.95%)	1,522,095	393,601 (+/- 45,506)	25.86% (+/- 2.99%)*
NV	24,894	5,900 (+/- 888)	23.70% (+/- 3.57%)	2,984,009	923,057 (+/- 162,885)	30.93% (+/- 5.46%)*
NH	485,051	101,314 (+/- 10,895)	20.89% (+/- 2.25%)	842,224	154,183 (+/- 28,440)	18.31% (+/- 3.38%)
NJ	0	-	-	8,805,677	2,367,158 (+/- 157,749)	26.88% (+/- 1.79%)
NM	193,627	64,667 (+/- 5,582)	33.40% (+/- 2.88%)	1,874,322	551,588 (+/- 54,691)	29.43% (+/- 2.92%)
NY	1,681,377	387,250 (+/- 18,357)	23.03% (+/- 1.09%)	17,544,036	5,439,077 (+/- 377,472)	31.00% (+/- 2.15%)*
NC	2,812,971	787,609 (+/- 26,672)	28.00% (+/- 0.95%)*	7,406,130	1,667,989 (+/- 111,424)	22.52% (+/- 1.50%)
ND	198,819	47,616 (+/- 2,437)	23.95% (+/- 1.23%)	548,020	119,937 (+/- 14,628)	21.89% (+/- 2.67%)
OH	1,732,116	391,340 (+/- 16,248)	22.59% (+/- 0.94%)	9,760,937	2,448,599 (+/- 160,369)	25.09% (+/- 1.64%)*
OK	1,292,884	357,856 (+/- 12,730)	27.68% (+/- 0.98%)	2,580,277	701,238 (+/- 73,878)	27.18% (+/- 2.86%)
OR	99,894	26,533 (+/- 2,800)	26.56% (+/- 2.80%)	4,041,648	1,011,740 (+/- 81,590)	25.03% (+/- 2.02%)
PA	1,319,821	316,434 (+/- 14,128)	23.98% (+/- 1.07%)	11,207,884	2,983,864 (+/- 185,715)	26.62% (+/- 1.66%)*
RI	0	-	-	1,029,523	283,032 (+/- 47,400)	27.49% (+/- 4.60%)
SC	962,303	281,814 (+/- 13,515)	29.29% (+/- 1.40%)*	4,034,980	955,147 (+/- 64,000)	23.67% (+/- 1.59%)
SD	208,481	52,742 (+/- 2,311)	25.30% (+/- 1.11%)	655,980	150,440 (+/- 15,175)	22.93% (+/- 2.31%)
TN	1,963,518	546,116 (+/- 17,281)	27.81% (+/- 0.88%)*	4,700,984	1,167,174 (+/- 95,367)	24.83% (+/- 2.03%)
TX	2,658,630	751,464 (+/- 21,119)	28.27% (+/- 0.79%)	25,630,874	7,682,354 (+/- 485,573)	29.97% (+/- 1.89%)
UT	117,887	24,348 (+/- 2,152)	20.65% (+/- 1.83%)	3,009,819	585,788 (+/- 83,115)	19.46% (+/- 2.76%)
VT	451,254	93,236 (+/- 7,607)	20.66% (+/- 1.69%)	155,989	28,564 (+/- 8,531)	18.31% (+/- 5.47%)
VA	1,999,733	528,774 (+/- 16,951)	26.44% (+/- 0.85%)*	6,361,871	1,495,588 (+/- 103,908)	23.51% (+/- 1.63%)
WA	372,319	97,167 (+/- 7,714)	26.10% (+/- 2.07%)*	7,091,218	1,592,247 (+/- 161,929)	22.45% (+/- 2.28%)
WV	715,682	197,859 (+/- 8,224)	27.65% (+/- 1.15%)*	1,056,712	265,718 (+/- 19,141)	25.15% (+/- 1.81%)
WI	1,227,177	274,892 (+/- 9,985)	22.40% (+/- 0.81%)	4,490,186	1,062,856 (+/- 85,879)	23.67% (+/- 1.91%)
WY	118,317	25,917 (+/- 2,874)	21.90% (+/- 2.43%)	450,819	95,707 (+/- 9,688)	21.23% (+/- 2.15%)

* in a rural - urban comparison, the population has a significantly higher high-risk rate based on a 90% confidence interval

Source: U.S. Census Bureau 2018 Community Resilience Estimates linked to U.S. Census Bureau's List of Population, Land Area, and Percent Urban and Rural in 2010

Figure One: Rural - Census Regions and Divisions of the United States

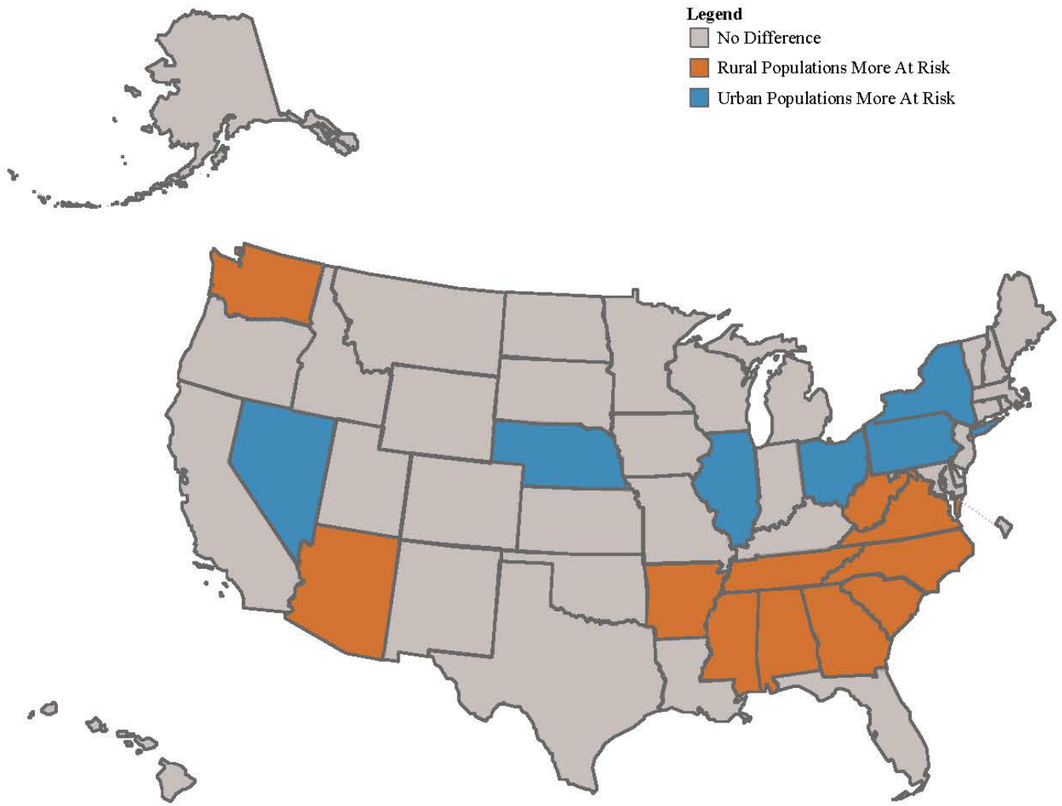


The Regions and Divisions of States in the United States

Midwest Region - East North Central Division	Illinois Indiana Michigan Ohio Wisconsin
Midwest Region - West North Central Division	Iowa Kansas Minnesota Missouri Nebraska North Dakota South Dakota
Northeast Region - Middle Atlantic Division	New Jersey New York Pennsylvania
Northeast Region - New England Division	Connecticut Maine Massachusetts New Hampshire Rhode Island Vermont
South Region - East South Central Division	Alabama Kentucky Mississippi Tennessee
South Region - South Atlantic Division	Delaware District of Columbia Florida Georgia Maryland North Carolina South Carolina Virginia West Virginia
South Region - West South Central Division	Arkansas Louisiana Oklahoma Texas
West Region - Mountain Division	Arizona Colorado Idaho Montana Nevada New Mexico Utah Wyoming
West Region - Pacific Division	Alaska California Hawaii Oregon Washington

Source: U.S. Census Bureau Regions and Divisions with State FIPS Codes
Notes: Prior to June 1984, the Midwest Region was designated as the North Central Region.

Figure Two: Rural - Urban Differences in High-Risk Population Rates

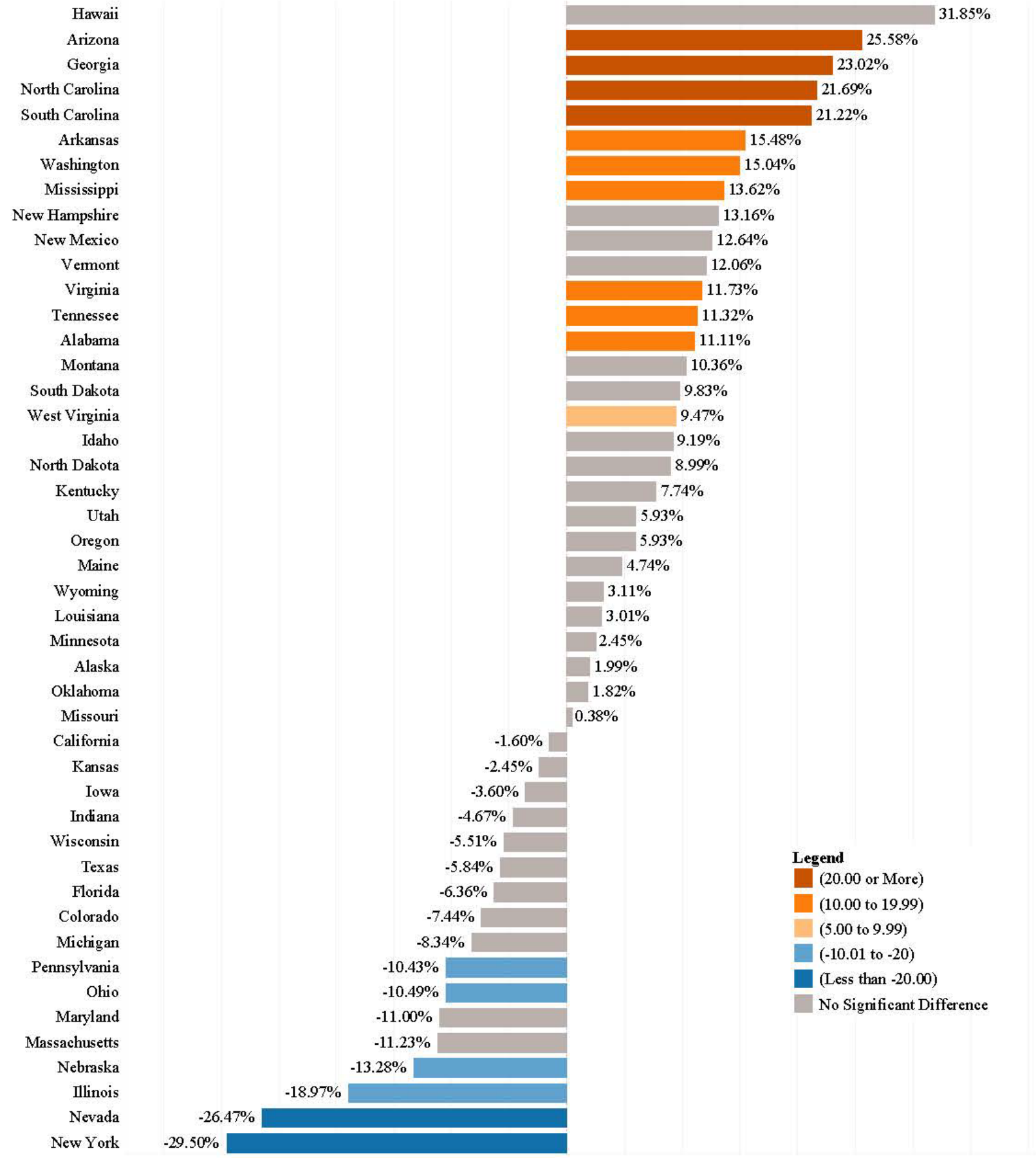


State Rural - Urban Differences

Urban Populations More At Risk	Illinois Nebraska Nevada New York Ohio Pennsylvania
Rural Populations More At Risk	Alabama Arizona Arkansas Georgia Mississippi North Carolina South Carolina Tennessee Virginia Washington West Virginia
No Difference	Alaska California Colorado Connecticut Delaware District of Columbia Florida Hawaii Idaho Indiana Iowa Kansas Kentucky Louisiana Maine Maryland Massachusetts Michigan Minnesota Missouri Montana New Hampshire New Jersey New Mexico North Dakota Oklahoma Oregon Rhode Island South Dakota Texas Utah Vermont Wisconsin Wyoming

Source: U.S. Census Bureau 2018 Community Resilience Estimates linked to U.S. Census Bureau's List of Population, Land Area, and Percent Urban and Rural in 2010
Notes: Difference is determined based on a 90% confidence interval.

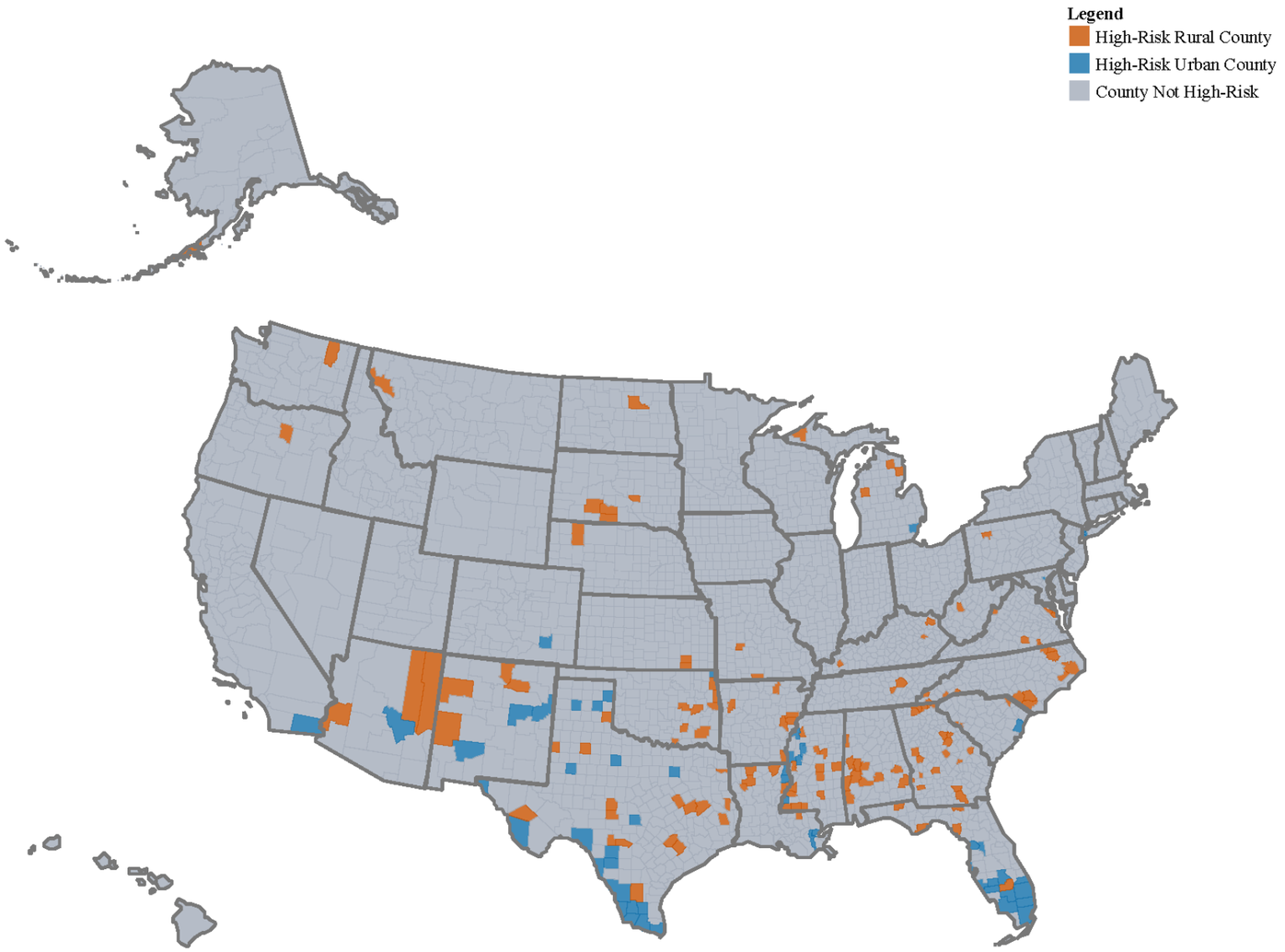
Figure Three: Percent Difference Between Rural and Urban High-Risk Population Rates



Source: U.S. Census Bureau 2018 Community Resilience Estimates linked to U.S. Census Bureau's List of Population, Land Area, and Percent Urban and Rural in 2010

Notes: For each state with rural and urban counties, this graph displays the percentage difference between the high risk rates for people in rural and urban counties. A positive value indicates a higher rural risk rate. A negative value indicates a higher urban risk rate. Percent difference = 100 * ([rural rate] - [urban rate]) / ([rural rate] * [urban rate] / 2). Difference is determined based on a 90% confidence interval.

Figure Four: High-Risk Counties, by Rural-Urban Status



Source: U.S. Census Bureau 2018 Community Resilience Estimates linked to U.S. Census Bureau's List of Population, Land Area, and Percent Urban and Rural in 2010
Notes: Counties tagged as high-risk are counties with high-risk population rates significantly greater than the national high-risk population rate of 26.52% (+/- 0.42%), using a 90% confidence interval.