# FEMA Community Resilience Challenges Index

Annual Update of Indicator Tables and Correlation Analysis

July 2024

 FEMA

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# List of 2022 Analysis of Community Resilience Indicators: Updated Census Data

The charts in this document provide details about each of the 22 indicators identified through the [2022 analysis of community resilience indicators](#) and available in the Resilience Analysis and Planning Tool (RAPT). The charts contain the April 2023 RAPT data update using American Community Survey five-year estimates 2017–2021. This summary is designed to provide transparency to users; it includes details about how each indicator was calculated in RAPT, and what data is available for each indicator. RAPT enables emergency managers and community partners to quickly visualize relative differences in potential resilience by county, Tribal Nation, and census tract. More information on RAPT can be found on the RAPT resource hub here: [https://rapt-fema.hub.arcgis.com/](https://rapt-fema.hub.arcgis.com/) .

Reference notes (lowercase letters) in the "Author rationale for including this indicator" sections indicate which of the resilience assessment methodologies identified in the analysis provided the explanation for why the indicator is an effective measure of community resilience. A key for the references ("a" through "n") follows at the end of this document. A description of binning methods used in the analysis is also included.

For each indicator, the following tables include:

- Indicator metric;
- Data source;
- Calculation (numerator and denominator);
- National average;
- Binning methods;
- Data geography (available at county, census tract, tribal, Puerto Rico and other);
- Methodologies referencing this indicator; and
- Author rationale for including this indicator.

Each table notes which of the following methodologies used each indicator:

- Australian Disaster Resilience Index (ANDRI) [a]
- Baseline Resilience Indicators for Communities (BRIC) [b]
- Composite Community Disaster Resilience Index (CCDRI) [c]
- Community Disaster Resilience Index (CDRI) [d]
- Community Resilience Index (CRI2) [e]
- Comprehensive Disaster Resilience Index (CDRI2) [f]
- Disaster Resilience of Place (DROP) [g]
- Fraser [h]
- Nursey-Brey (N-B) [i]
- Resilience Capacity Index (RCI) [j]

- Regional Climate Resilience Index (RCRI) [k]

- Social Vulnerability Index (SoVI) [l]

- Social Vulnerability Index (SVI) [m]

- The Composite Resilience Index (TCRI) [n]

Definitions of "community resilience" used in the methodologies cited in this report can be found in the RAPT Resource Center in the "Community Resilience Challenges Index" section.

# Indicator Binning Methodology

With such large datasets, grouping or "binning" the data[1] and assigning consistent color ramps for the bins provide a visual cue to quickly grasp a data range. While the specific datapoint for the geography (county, census tract or Tribal Nation) is also available, the bins provide a more immediate, high-level understanding of a geographic area's characteristics.

To bin each dataset for mapping, Argonne used the Python Spatial Analysis Library, PySAL, and its Exploratory Spatial Data Analysis sub-package. Python is an open-source, high-level programming language that is used in social science research. The package includes nine binning methods. Rather than make arbitrary "breaks" in the data, these binning methods allowed the research team to use the best binning method that would group data that are close in value to each other and maximize the variance between bins.

The team evaluated which of the nine binning methods (1) best fit the relationships of the breaks to each dataset's means and medians and (2) could be consistently replicated. This analysis identified four binning methods as the best fit for most datasets. For the county-level datasets, the research team binned the dataset into five bins. For the indicators with census tract data, the research team binned the dataset into seven bins, allowing greater differentiation with these substantially larger datasets.

The binning methods for the 22 commonly used indicators are:

- **Fisher–Jenks Breaks:** This method aims to return class breaks such that classes are internally homogenous while assuring heterogeneity among classes. The Python toolkit calculates squared deviations against class means.

- **Jenks–Caspall Breaks:** This method aims to minimize the absolute deviation from within-class medians. Python's calculation focuses on within-class absolute deviations from the median.

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[1] For a detailed discussion of the binning process, see section 3.3 of the Community Resilience Challenges Index.

- **Head/Tail Breaks:** Algorithmically optimal breaks and the number of classes are based on the dataset itself. The Head/Tails Breaks method works well with heavily tailed datasets, iterating through the data to minimize around the mean.[2]

- **Other:** In specific cases, the team used alternative criteria to select binning methodologies.

  - Income: A convention for displaying income data already exists: $0–20,000, $20,001–$40,000, etc. (an intuitive methodology similar to equal intervals).

  - Population Change: The population change dataset is provided by the U.S. Census as "net migration," which provides a positive (increase in population) or negative (decrease in population) number.[3] Large population changes in either direction could cause challenges to resilience. The team chose to represent the population change data as standard deviations from zero, where less change is preferred to more change (regardless of whether the change is positive or negative).

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[2] Jiang, B., 2013, Head/tail Breaks: A New Classification Scheme for Data with a Heavy-tailed Distribution. The Professional Geographer, 65, 482-494.

[3] U.S. Census Bureau. https://www.census.gov/glossary/#term_Netmigration?term=Net+migration  accessed March 20, 2023.

# Population Characteristics: 3 Indicators

## Indicator 1: Population without High School Diploma

### Table 1: Terms and Descriptions for Population Characteristics Indicator 1

| Term | Description |
|---|---|
| Metric | Percentage of population over age 25 without a high school diploma or General Educational Development (GED) |
| Data Source | American Community Survey (ACS) 2018–2022 five-year estimates, Table S1501 |
| National Average | 10.9% of the population over age 25 do not have a high school diploma or GED. |
| Binning Methods | **Census Tract:** Jenks Caspall<br>**County:** Jenks Caspall |
| Data Geography | Data is available at the Census tract, county and tribal levels. Puerto Rico is included. |
| Author Rationale for Including This Indicator | ▪ Higher levels of education are associated with health, as well as an improved ability to communicate and comprehend information. [b,m]<br><br>▪ Education is included as an input to economic resilience as higher levels of education is a characteristic of a strong labor force and supports individuals' ability to access community resources. [d,j]<br><br>▪ Higher levels of education can improve the capacity to prepare for, and respond to, the stress of disasters. [a,g,n]<br><br>▪ For individuals with lower levels of education, the practical and bureaucratic hurdles to assist in coping with, and recovering from, a disaster are much more difficult to navigate. [m] |

### Table 2: Methodologies Using Population Characteristics Indicator 1

| # of 14 | ANDRI | BRIC | CDRI | CRI2 | DROP | RCI | SoVI | SVI | TCRI | N-B | CCDRI | RCRI | CDRI2 | Fraser |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 11 | X | X | X | X | X | X | X | X | | X | | | X | X |

## Indicator 2: Population Age 65 and Older

### Table 3: Terms and Descriptions for Population Characteristics Indicator 2

| Term | Description |
|------|-------------|
| Metric | Percentage of the population age 65 and older |
| Data Source | ACS 2018–2022 five-year estimates, Table S0101 |
| National Average | 16.5% of the U.S. population is age 65 and older. |
| Binning Methods | **Census Tract:** Fisher Jenks<br>**County:** Jenks Caspall |
| Data Geography | Data is available at the Census tract, county and tribal levels. Puerto Rico is included. |
| Author Rationale for Including This Indicator | ▪ Several methodologies noted that the percentage of elderly adults in the population could affect resilience. [a,b,g]<br><br>▪ Those over 65 tend to be less mobile. [n]<br><br>▪ Those over 65 may find it more difficult to prepare for disasters and adapt to extreme circumstances. [n]<br><br>▪ Many people over 65 require assistance from family, neighbors and their community, which might not be available during a disaster. [m] |

### Table 4: Methodologies Using Population Characteristics Indicator 2

| # of 14 | ANDRI | BRIC | CDRI | CRI2 | DROP | RCI | SoVI | SVI | TCRI | N-B | CCDRI | RCRI | CDRI2 | Fraser |
|---------|-------|------|------|------|------|-----|------|-----|------|-----|-------|------|-------|--------|
| 9 | X | X | | | X | | X | X | X | | | X | X | X |

## Indicator 3: Population with a Disability

### Table 5: Terms and Descriptions for Population Characteristics Indicator 3

| Term | Description |
|---|---|
| Metric | Percentage of the population with a disability[5] |
| Data Source | ACS 2018–2022 five-year estimates, Table S1810 |
| National Average | 12.9% of the U.S. population has a disability. |
| Binning Methods | **Census Tract:** Fisher Jenks<br>**County:** Jenks Caspall |
| Data Geography | Data is available at the Census tract, county and tribal levels. Puerto Rico is the only U.S. territory included. |
| Author Rationale for Including this Indicator | ▪ Individuals with disabilities tend to be more vulnerable to physical, social and economic challenges. [b,j]<br><br>▪ Having functional, mobility or access needs can make responding to disasters more challenging, including adapting to extreme circumstances and dealing with the increased stress. [a,j,n]<br><br>▪ During an emergency, family members, neighbors or a caretaker may be less able to provide support to individuals with special needs that require the assistance of others. [m] |

### Table 6: Methodologies Using Population Characteristics Indicator 3

| # of 14 | ANDRI | BRIC | CDRI | CRI2 | DROP | RCI | SoVI | SVI | TCRI | N-B | CCDRI | RCRI | CDRI2 | Fraser |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 7 | X | X | | | X | X | | X | X | X | | | | |

# Household Characteristics: 4 Indicators

## Indicator 1: Households without a Vehicle

### Table 7: Terms and Descriptions for Household Characteristics Indicator 1

| Term | Description |
|---|---|
| Metric | Percentage of occupied housing units with no vehicles available |
| Data Source | ACS 2018–2022 five-year estimates, Table B08201 |
| National Average | 8.3% of households are without a vehicle. |
| Binning Methods | **Census Tract:** Jenks Caspall<br>**County:** Head Tail Breaks |
| Data Geography | Data is available at the Census tract, county and tribal levels. Puerto Rico is included. |
| Author Rationale for Including This Indicator | ▪ Access to transportation helps individuals support their livelihoods and provides critical mobility to adapt to the extreme circumstances of a disaster. [d,g,n]<br>▪ Communities where fewer individuals have access to a vehicle may have less resilience to a disaster. [b]<br>▪ Lack of access to a vehicle can be especially problematic in terms of evacuation in urban areas where automobile ownership is lower, especially among inner city poor populations. [m] |

### Table 8: Methodologies Using Household Characteristics Indicator 1

| # of 14 | ANDRI | BRIC | CDRI | CRI2 | DROP | RCI | SoVI | SVI | TCRI | N-B | CCDRI | RCRI | CDRI2 | Fraser |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 9 | X | X | X | | X | | X | X | X | | X | | | X |

## Indicator 2: Households with Limited English

### Table 9: Terms and Descriptions for Household Characteristics Indicator 2

| Term | Description |
|---|---|
| Metric | Percentage of households in which everyone 14 and older has difficulty speaking English.[6] |
| Data Source | ACS 2018–2022 five-year estimates, Table S1602 |
| National Average | 4.4% of U.S. households are limited English- speaking households where all members 14 or older have difficulty speaking English. |
| Binning Methods | **Census Tract:** Fisher Jenks<br>**County:** Head Tail Breaks |
| Data Geography | Data is available at the Census tract, county and tribal levels. Puerto Rico is included. |
| Author Rationale for Including This Indicator | ▪ Proficiency in English supports community resilience because of improved ability to communicate between individuals, as well as allowing individuals to better access community resources. [a,d,m]<br><br>▪ Greater numbers of proficient English speakers can be vital for effective communication interactions in the event of a disaster. [b,n]<br><br>▪ In communities where the first language is neither English nor Spanish, accurate translations of advisories may be scarce. [m]<br><br>▪ Communities with fewer English-speaking residents may demonstrate lower levels of resilience. [g] |

### Table 10: Methodologies Using Household Characteristics Indicator 2

| # of 14 | ANDRI | BRIC | CDRI | CRI2 | DROP | RCI | SoVI | SVI | TCRI | N-B | CCDRI | RCRI | CDRI2 | Fraser |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 7 | X | X | X | | X | | X | X | X | | | | | |

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[6] A "limited English-speaking household" is one in which no member 14 years and older speaks only English or speaks a non-English language and speaks English "very well." In other words, all members 14 years and older have at least some difficulty with English (https://census.gov/library/visualizations/2017/comm/english-speaking.html.html, accessed August 7, 2018).

## Indicator 3: Single-Parent Households

**Table 11: Terms and Descriptions for Household Characteristics Indicator 3**

| Term | Description |
|---|---|
| Metric | Percentage of households with single parents of children under 18 (no spouse/partner present) |
| Data Source | ACS 2018–2022 five-year estimates, Table B09005 |
| National Average | 24.9% of U.S. family households are single-parent households. |
| Binning Methods | **Census Tract:** Jenks Caspall<br>**County:** Fisher Jenks |
| Data Geography | Data is available at the Census tract, county and tribal levels. Puerto Rico is included. |
| Author Rationale for Including This Indicator | • Single-parent households are more vulnerable to a disaster because they tend to have lower socioeconomic status and fewer sources of social support than that of two-parent families. [f,m]<br><br>• Single-parent households are also vulnerable, since all daily responsibilities fall to one parent, making recovery more difficult. [m] |

**Table 12: Methodologies Using Household Characteristics Indicator 3**

| # of 14 | ANDRI | BRIC | CDRI | CRI2 | DROP | RCI | SoVI | SVI | TCRI | N-B | CCDRI | RCRI | CDRI2 | Fraser |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 7 | X | | | X | | | X | X | | X | | | X | X |

# Indicator 4: Households without a Smartphone

### Table 13: Terms and Descriptions for Household Characteristics Indicator 4

| Term | Description |
|------|-------------|
| Metric | Percent of households without a smartphone |
| Data Source | ACS 2018–2022 five-year estimates, Table S2801 |
| National Average | 11.8% of U.S. households do not have a smartphone. |
| Binning Methods | **Census Tract:** Jenks Caspall<br>**County:** Jenks Caspall |
| Data Geography | Data is available at the Census tract, county and tribal levels. Puerto Rico is included. |
| Author Rationale for Including This Indicator | ▪ Access to telephones enables communication which is vital during disaster events. [b]<br><br>▪ Communities with more access to telephone services will be better prepared for and will respond better before and during a disaster. [c]<br><br>▪ Availability and accessibility of natural hazard information and community engagement encourages risk awareness. [a] |

### Table 14: Methodologies Using Household Characteristics Indicator 4

| # of 14 | ANDRI | BRIC | CDRI | CRI2 | DROP | RCI | SoVI | SVI | TCRI | N-B | CCDRI | RCRI | CDRI2 | Fraser |
|---------|-------|------|------|------|------|-----|------|-----|------|-----|-------|------|-------|--------|
| 5 | X | X | X | | X | | | | | | X | | | |

# Housing: 2 Indicators

## Indicator 1: Mobile Homes as a Percentage of Housing Units

### Table 15: Terms and Descriptions for Housing Indicator 1

| Term | Description |
|------|-------------|
| Metric | Percentage of housing units that are mobile homes |
| Data Source | U.S. Census ACS 2018–2022 five-year estimates, Table DP04 |
| National Average | 5.8% of housing units in the U.S. are mobile homes. |
| Binning Methods | **Census Tract:** Fisher Jenks<br>**County:** Jenks Caspall |
| Data Geography | Data is available at the Census tract, county and tribal levels. Puerto Rico is included. |
| Author Rationale for Including This Indicator | ▪ Higher numbers of mobile homes in a community are related to lower levels of resilience because of the lower-quality construction of these homes and lack of basements, which makes them particularly susceptible to damage from hazards. [b,g,m]<br><br>▪ Mobile homes are frequently found outside of metropolitan areas that may not be readily accessible by interstate highways or public transportation. [m] |

### Table 16: Methodologies Using Housing Indicator 1

| # of 14 | ANDRI | BRIC | CDRI | CRI2 | DROP | RCI | SoVI | SVI | TCRI | N-B | CCDRI | RCRI | CDRI2 | Fraser |
|---------|-------|------|------|------|------|-----|------|-----|------|-----|-------|------|-------|--------|
| 6 | X | X | | | X | | X | X | | | X | | | |

## Indicator 2: Owner-Occupied Housing

### Table 17: Terms and Descriptions for Housing Indicator 2

| Term | Description |
|---|---|
| Metric | Percentage of housing units that are owner- occupied |
| Data Source | ACS 2018–2022 five-year estimates, Table DP04 |
| National Average | 57.8% of housing units in the U.S. are owner- occupied. |
| Binning Methods | **Census Tract:** Jenks Caspall<br>**County:** Jenks Caspall |
| Data Geography | Data is available at the Census tract, county and tribal levels. Puerto Rico is included. |
| Author Rationale for Including This Indicator | ▪ Home ownership is often included as a measure of a community's economic strength and thus is a marker of community resilience. [b,d,g,n]<br><br>▪ Home ownership is also used to reflect residents' levels of place attachment to their communities. [d,j]<br><br>▪ Low levels of home ownership may indicate a community with a faltering economy and a population with less long-term commitment to the community, which could hamper both individual and community mitigation actions to prepare for disaster as well as recovery efforts. [a,j] |

### Table 18: Methodologies Using Housing Indicator 2

| # of 14 | ANDRI | BRIC | CDRI | CRI2 | DROP | RCI | SoVI | SVI | TCRI | N-B | CCDRI | RCRI | CDRI2 | Fraser |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 6 | X | X | X | | X | X | | | X | | | | | |

# Healthcare: 3 Indicators

## Indicator 1: Number of Hospitals

**Table 19: Terms and Descriptions for Healthcare Indicator 1**

| Term | Description |
|------|-------------|
| Metric | The number of hospitals per 10,000 people |
| Data Source | U.S. Census Bureau, 2021 County Business Patterns, Table 00A1, NAICS code 622110 |
| National Average | There are 0.177 hospitals per 10,000 people in the U.S. |
| Binning Methods | **Census Tract:** Fisher Jenks<br>**County:** Head Tail Breaks |
| Data Geography | Data is available at the county level. Puerto Rico is included. |
| Author Rationale for Including This Indicator | ▪ This measure represents essential community infrastructure, both because it represents the capacity of the healthcare system to support residents' overall health and to provide critical emergency medical care. [a,b,d,g,n]<br><br>▪ Lack of this critical capacity negatively affects a community's ability to respond to and recover from disasters. [d] |

**Table 20: Methodologies Using Healthcare Indicator 1**

| # of 14 | ANDRI | BRIC | CDRI | CRI2 | DROP | RCI | SoVI | SVI | TCRI | N-B | CCDRI | RCRI | CDRI2 | Fraser |
|---------|-------|------|------|------|------|-----|------|-----|------|-----|-------|------|-------|--------|
| 9 | X | X | X | | X | | X | | X | | X | X | | X |

## Indicator 2: Medical Professional Capacity

### Table 21: Terms and Definitions for Healthcare Indicator 2

| Term | Description |
|------|-------------|
| Metric | The number of health-diagnosing and treating practitioners per 1,000 population |
| Data Source | ACS 2018–2022 five-year estimates, Table S2401 |
| National Average | There are 20.6 health diagnosing and treating practitioners per 1,000 population in the U.S. |
| Binning Methods | **Census Tract:** Jenks Caspall<br>**County:** Fisher Jenks |
| Data Geography | Data is available at the county level. Puerto Rico is included. |
| Author Rationale for Including This Indicator | ▪ Availability of physicians is linked with the overall physical and mental health of community residents. [b,d,f,g]<br>▪ Lack of access to physicians is related to lower levels of overall community resilience as indicated by low birthweight and premature mortality. [f]<br>▪ Physicians are a critical emergency resource in the response to and recovery from a disaster. [a] |

### Table 22: Methodologies Using Healthcare Indicator 2

| # of 14 | ANDRI | BRIC | CDRI | CRI2 | DROP | RCI | SoVI | SVI | TCRI | N-B | CCDRI | RCRI | CDRI2 | Fraser |
|---------|-------|------|------|------|------|-----|------|-----|------|-----|-------|------|-------|--------|
| 8 | X | X | X | X | X | | | | | | X | X | | X |

## Indicator 3: Population without Health Insurance

### Table 23: Terms and Descriptions for Healthcare Indicator 3

| Term | Description |
|------|-------------|
| Metric | Percentage of the population without health insurance |
| Data Source | ACS 2018–2022 five-year estimates, Table S2701 |
| National Average | 8.7% of the U.S. population does not have health insurance. |
| Binning Methods | **Census Tract:** Jenks Caspall<br>**County:** Jenks Caspall |
| Data Geography | Data is available at the Census tract, county and tribal levels. Puerto Rico is included. |
| Author Rationale for Including This Indicator | ▪ Health is a critical component of community well-being. An unhealthy population has more difficulty accessing community support or engaging in the process of building disaster resilience. [d,g]<br><br>▪ Communities with more individuals covered by health insurance tend to have higher measures of physical and mental health. [b,g]<br><br>▪ Health insurance coverage is one indication of individuals' capacity to effectively respond to and recover from a crisis, both mentally and physically. [j]<br><br>▪ Communities with lower percentages of individuals with health insurance may have lower levels of resilience. [g] |

### Table 24: Methodologies Using Healthcare Indicator 3

| # of 14 | ANDRI | BRIC | CDRI | CRI2 | DROP | RCI | SoVI | SVI | TCRI | N-B | CCDRI | RCRI | CDRI2 | Fraser |
|---------|-------|------|------|------|------|-----|------|-----|------|-----|-------|------|-------|--------|
| 7 | | X | X | | X | X | X | | | | X | | | X |

# Economic: 6 Indicators

## Indicator 1: Unemployed Labor Force

### Table 25: Terms and Descriptions for Economic Indicator 1

| Term | Description |
|---|---|
| Metric | Percentage of the civilian labor force age 16 and over who are unemployed |
| Data Source | ACS 2018–2022 five-year estimates, Table DP03 |
| National Average | 5.3% of the civilian labor force age 16 and over are unemployed. |
| Binning Methods | **Census Tract:** Fisher Jenks<br>**County:** Jenks Caspall |
| Data Geography | Data is available at the Census tract, county and tribal levels. Puerto Rico is included. |
| Author Rationale for Including This Indicator | ▪ High levels of employment contribute to a healthy community economy, which supports community resilience. [a,b,f,g,n]<br><br>▪ Employment also provides residents with financial resources that contribute to their livelihoods. [d]<br><br>▪ Unemployed persons do not have the employee benefit plans that provide income and health cost assistance in the event of injury or death. [m]<br><br>▪ Counties with higher levels of unemployment may have fewer community resources to support residents' needs and a population that is both less prepared for a disaster and less able to cope with the aftermath. [n] |

### Table 26: Methodologies Using Economic Indicator 1

| # of 14 | ANDRI | BRIC | CDRI | CRI2 | DROP | RCI | SoVI | SVI | TCRI | N-B | CCDRI | RCRI | CDRI2 | Fraser |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 13 | X | X | X | X | X |  | X | X | X | X | X | X | X | X |

## Indicator 2: Income Inequality

### Table 27: Terms and Definitions for Economic Indicator 2

| Term | Description |
|------|-------------|
| Metric | Gini Index of income distribution across a population; the closer to 1, the greater the income inequality.[7] |
| Data Source | ACS 2018–2022 five-year estimates, Table B19083 |
| National Average | The average Gini Index in the U.S. is 0.48. |
| Binning Methods | **Census Tract:** Jenks Caspall<br>**County:** Jenks Caspall |
| Data Geography | Data is available at the county and tribal levels. Puerto Rico is included. |
| Author Rationale for Including This Indicator | ▪ The economic environment is a major factor in a community's resilience; when income inequality is present, earnings tend to be distributed in a way that does not support broader community goals. [b,f,g]<br><br>▪ A skewed distribution of economic resources may negatively affect the cohesiveness of the residents' response to a disaster. [j] |

### Table 28: Methodologies Using Economic Indicator 2

| # of 14 | ANDRI | BRIC | CDRI | CRI2 | DROP | RCI | SoVI | SVI | TCRI | N-B | CCDRI | RCRI | CDRI2 | Fraser |
|---------|-------|------|------|------|------|-----|------|-----|------|-----|-------|------|-------|--------|
| 10 | | X | | X | X | X | | | | | X | | X | |

[7] The Gini Index or coefficient uses a scale of 0–1 to measure the difference between the ideal distribution of income (perfect equality [0] where 50 percent of the population would receive 50 percent of the available income) and the actual distribution. The closer the number is to 1, the greater the income inequality.

## Indicator 3: Median Household Income

### Table 29: Terms and Descriptions for Economic Indicator 3

| Term | Description |
|------|-------------|
| Metric | Median household income |
| Data Source | ACS 2018–2022 five-year estimates, Table S1903 |
| National Average | The median household income in the U.S. is $75,149. |
| Binning Methods | **Census Tract:** Manual<br>**County:** Manual |
| Data Geography | Data is available at the Census tract, county and tribal levels. Puerto Rico is included. |
| Author Rationale for Including This Indicator | ▪ There is a strong relationship between individuals' financial resources and their resilience to a disaster. [b,d]<br>▪ Low-income households are at greater risk because they tend to live in lower-quality housing situated in higher-risk areas, are less likely to have prepared for a disaster, and have fewer resources to support recovery. [d]<br>▪ The median household income of a community may also reflect its economic resilience and the community resources available to support recovery. [n] |

### Table 30: Methodologies Using Economic Indicator 3

| # of 14 | ANDRI | BRIC | CDRI | CRI2 | DROP | RCI | SoVI | SVI | TCRI | N-B | CCDRI | RCRI | CDRI2 | Fraser |
|---------|-------|------|------|------|------|-----|------|-----|------|-----|-------|------|-------|--------|
| 6 | X | | X | X | | | | | X | X | | | X | |

# Indicator 4: Unemployed Women in the Labor Force

**Table 31: Terms and Descriptions for Economic Indicator 4**

| Term | Description |
|---|---|
| Metric | Percent of women in the civilian work force age 16 and over who are unemployed |
| Data Source | ACS 2018–2022 5-year estimates, Table DP03 |
| National Average | 5.3% of women in the workforce age 16 and over are unemployed. |
| Binning Methods | **Census Tract:** Jenks Caspall<br>**County:** Fisher Jenks |
| Data Geography | Data is available at the Census tract, county and tribal levels. Puerto Rico is included. |
| Author Rationale for Including This Indicator | ▪ Communities enhance disaster resilience through nondiscriminatory wage policies, ensuring that all groups have fair access to resources. [b]<br><br>▪ Economic stability at the community level, particularly the stability of livelihoods, is an indicator of resilience. [g] |

**Table 32: Methodologies Using Economic Indicator 4**

| # of 14 | ANDRI | BRIC | CDRI | CRI2 | DROP | RCI | SoVI | SVI | TCRI | N-B | CCDRI | RCRI | CDRI2 | Fraser |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 6 | | X | | | X | | X | | | X | | | X | X |

## Indicator 5: Population Below Poverty Level

**Table 33: Terms and Descriptions for Economic Indicator 5**

| Term | Description |
|---|---|
| Metric | Population below U.S. Census poverty level in past 12 months[8] |
| Data Source | ACS 2018–2022 5-year estimates, Table S1701 |
| National Average | 12.5% of the U.S. population lives below the poverty level. |
| Binning Methods | **Census Tract:** Jenks Caspall<br>**County:** Jenks Caspall |
| Data Geography | Data is available at the Census tract, county and tribal levels. Puerto Rico is included. |
| Author Rationale for Including This Indicator | ▪ Economic resources play an important role in boosting resilience and adaptive capacity. [d]<br>▪ Economically disadvantaged populations are disproportionately affected by disasters. The poor are less likely to have the income or assets needed to prepare for a possible disaster or to recover after a disaster. [m] |

**Table 34: Methodologies Using Economic Indicator 5**

| # of 14 | ANDRI | BRIC | CDRI | CRI2 | DROP | RCI | SoVI | SVI | TCRI | N-B | CCDRI | RCRI | CDRI2 | Fraser |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 5 | X | | | | | X | X | X | | | | | X | |

## Indicator 6: Workforce Employed in Predominant Sector

### Table 35: Terms and Descriptions for Economic Indicator 6

| Term | Description |
|---|---|
| Metric | Percent of workforce employed in the predominant sector |
| Data Source | ACS 2018–2022 5-year estimates, Table DP03 |
| National Average | 23.3% of the workforce is employed in the dominant sector of their county |
| Binning Methods | **Census Tract:** Fisher Jenks<br>**County:** Fisher Jenks |
| Data Geography | Data is available at the Census tract, county and tribal levels. Puerto Rico is included. |
| Author Rationale for Including This Indicator | ▪ Diversity is important for long-term economic resilience; the local economy should not be overly dependent on continuing success in just one sector. [b]<br>▪ In a diversified environment, if one industry weakens or fails, there are others that can provide employment and sustain the regional economy. [f] |

### Table 36: Methodologies Using Economic Indicator 6

| # of 14 | ANDRI | BRIC | CDRI | CRI2 | DROP | RCI | SoVI | SVI | TCRI | N-B | CCDRI | RCRI | CDRI2 | Fraser |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 5 | X | X | | X | X | X | | | | | | | | |

# Connection to Community: 4 Indicators

## Indicator 1: Percent of Inactive Voters

**Table 37: Terms and Descriptions for Connection to Community Indicator 1**

| Term | Description |
|---|---|
| Metric | Percent of inactive voters (defined differently by state) [9] |
| Data Source | 2020 U.S. Election Assistance Commission - Election Administration and Voting Survey |
| National Average | 9.0% of registered voters in the U.S. are inactive.[10] |
| Binning Methods | **Census Tract:** Fisher Jenks<br>**County:** Fisher Jenks |
| Data Geography | Data is available at the county level. Alaska, Puerto Rico and territorial data were provided at a State/Territorial level only, so the data for counties within those areas were imputed from the State/Territorial number.[11] |
| Author Rationale for Including This Indicator | ▪ An active voting population is an indicator of having a community that is engaged, enhancing overall community resilience. [c]<br><br>▪ Participation in elections increases social and political trust. [d]<br><br>▪ Civic engagement, including voting, is an important form of bridging social capital. [h] |

**Table 38: Methodologies Using Connection to Community Indicator 1**

| # of 14 | ANDRI | BRIC | CDRI | CRI2 | DROP | RCI | SoVI | SVI | TCRI | N-B | CCDRI | RCRI | CDRI2 | Fraser |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 10 | X | X | X | X | X | X | | | | | X | X | X | X |

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[9] Inactive voter is defined by each State. For more information see:
https://www.eac.gov/sites/default/files/eac_assets/1/1/2014_Statutory_Overview_Final-2015-03-09.pdf.
[10] For more information on the Election Administration and Voting Survey 2020 Comprehensive Report see:
https://www.eac.gov/sites/default/files/document_library/files/2020_EAVS_Report_Final_508c.pdf.
[11] For more information on the Election Administration and Voting Survey 2020 Comprehensive Report see:
https://www.eac.gov/sites/default/files/document_library/files/2020_EAVS_Report_Final_508c.pdf.

## Indicator 2: Presence of Civic and Social Organizations

### Table 39: Terms and Descriptions for Connection to Community Indicator 2

| Term | Description |
|---|---|
| Metric | Number of civic and social organizations per 10,000 people |
| Data Source | U.S. Census Bureau, 2021 County Business Patterns, Table 00A1, NAICS Code 8134 |
| National Average | There are .74 civic and social organizations per 10,000 people |
| Binning Methods | **Census Tract:** Fisher Jenks<br>**County:** Head Tail Breaks |
| Data Geography | Data is available at the county level. Puerto Rico is included. |
| Author Rationale for Including This Indicator | ▪ This measure indicates the level of community engagement by looking at the level of civic infrastructure through which residents support their communities. [b,f,g,j]<br><br>▪ Participation in civic organizations provides a mechanism for residents to invest in and take from their community and also increases networking and trusted relationships. [d,j]<br><br>▪ The availability of formal social networks can be critical during response and recovery to quickly mobilize resources and disseminate information. [b,d,f]<br><br>▪ Residents who participate in local civic organizations can use them for help and provide mutually beneficial cooperation during a crisis. [b,f] |

### Table 40: Methodologies Using Connection to Community Indicator 2

| # of 14 | ANDRI | BRIC | CDRI | CRI2 | DROP | RCI | SoVI | SVI | TCRI | N-B | CCDRI | RCRI | CDRI2 | Fraser |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 6 | | X | X | X | X | X | | | | | | | | X |

## Indicator 3: Population without Religious Affiliation

### Table 41: Terms and Descriptions for Connection to Community Indicator 3

| Term | Description |
|------|-------------|
| Metric | Percentage of the population that do not affiliate with a religion |
| Data Source | Association of Statisticians of American Religious Bodies. 2020 U.S. Religion Census. http://www.usreligioncensus.org/index.php |
| National Average | 48.8% of the U.S. population are not religious adherents. |
| Binning Methods | **Census Tract:** Jenks Caspall<br>**County:** Jenks Caspall |
| Data Geography | Data is available at the county level. |
| Author Rationale for Including This Indicator | ▪ Affiliation with a religious organization or civic organization can be used as a proxy measure for social connectedness, and how much a community may be able to rely on the good will of other local citizens, leading to reciprocity and mutually beneficial cooperation. [b,f,g]<br><br>▪ Religious adherents can access additional support beyond their family and neighbors. Religious organizations are often organized to actively provide physical and social support to their congregations and communities during times of individual and community crisis. [b,d,f] |

### Table 42: Methodologies Using Connection to Community Indicator 3

| # of 14 | ANDRI | BRIC | CDRI | CRI2 | DROP | RCI | SoVI | SVI | TCRI | N-B | CCDRI | RCRI | CDRI2 | Fraser |
|---------|-------|------|------|------|------|-----|------|-----|------|-----|-------|------|-------|--------|
| 6 | | X | X | X | X | | | | | | X | | | X |

## Indicator 4: Population Change

### Table 43: Terms and Descriptions for Connection to Community Indicator 4

| Term | Description |
|---|---|
| Metric | Net change in population from people moving in or out of the county relative to the U.S. mean |
| Data Source | U.S. Census Bureau, Population Division. Table: Cumulative Estimate of the Components of Resident Population Change (PEPTCOMP): 2018–2022 |
| National Average | Not Applicable |
| Binning Methods | **Census Tract:** Standard Deviation<br>**County:** Standard Deviation |
| Data Geography | Data is available at the county level. |
| Author Rationale for Including This Indicator | ▪ Communities where large numbers of residents have lived for extended periods are likely to have strong place attachment, to be invested in the well-being of the community before a disaster, and to be willing to respond to revitalize a community after a disaster. [b,j]<br><br>▪ Familiarity can help individuals navigate a community during an acute crisis, as well as know how to access services after the crisis has passed. [j]<br><br>▪ A rapid influx of new residents may result in lower levels of attachment to the community, less familiarity with local hazards and how to prepare for them, and fewer community connections that can provide support during a crisis. [b,f,j]<br><br>▪ A reduction in population will reduce local tax income and community resources to respond to a disaster. [b] |

### Table 44: Methodologies Using Connection to Community Indicator 4

| # of 14 | ANDRI | BRIC | CDRI | CRI2 | DROP | RCI | SoVI | SVI | TCRI | N-B | CCDRI | RCRI | CDRI2 | Fraser |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 6 | X | X | | X | | X | | | | X | X | | | |

# Key for Methodologies Cited under "Author Rationale for Including This Indicator"

a **ANDRI:** Phil Morley, Melissa Parsons and Sarb Johal, 2017, "The Australian Natural Disaster Resilience Index: A System for Assessing the Resilience of Australian Communities to Natural Hazards," Bushfire & Natural Hazards CRC. Available at https://www.bnhcrc.com.au/research/hazard-resilience/251, accessed March 20, 2023.

b **BRIC:** Susan L. Cutter, Kevin D. Ash and Christopher T. Emrich, 2014, "Baseline Resilience Indicators for Communities, the Geographies of Community Disaster Resilience," *Global Environmental Change* 29, 65–77.

c **CCDRI:** Rifat, S. A. A., & Liu, W., 2020, "Measuring Community Disaster Resilience in the Conterminous Coastal United States." *ISPRS International Journal of Geo-Information*. Available at https://www.mdpi.com/2220-9964/9/8/469/pdf, accessed March 20, 2023.

d **CDRI:** Walter Gillis Peacock, et al., 2010, "Advancing Resilience of Coastal Localities: Developing, Implementing, and Sustaining the Use of Coastal Resilience Indicators: A Final Report," *Hazard Reduction and Recovery Center*, Available at https://www.researchgate.net/profile/Walter-Peacock/publication/346474442_Advancing_the_Resilience_of_Coastal_Localities_Developing_Implementing_and_Sustaining_the_Use_of_Coastal_Resilience_Indicators_A_Final_Report/links/5fc43376458515b79788e5cd/Advancing-the-Resilience-of-Coastal-Localities-Developing-Implementing-and-Sustaining-the-Use-of-Coastal-Resilience-Indicators-A-Final-Report.pdf, accessed March 20, 2023.

e **CDRI2:** Marzi, S., Mysiak, J., Essenfelder, A. H., Amadio, M., Giove, S., & Fekete, A.., 2019, "Constructing a Comprehensive Disaster Resilience Index: The Case of Italy." *PloS one.* Available at https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0221585, accessed March 20, 2023.

f **CRI2:** Kathleen Sherrieb, Fran H. Norris and Sandro Galea, 2010, "Measuring Capacities for Community Resilience," *Social Indicators Research* 99: 227–247.

g **DROP:** Susan L. Cutter, Christopher G. Burton and Christopher T. Emrich, 2010, "Disaster Resilience of Place, Disaster Resilience Indicators for Benchmarking Baseline Conditions," *Journal of Homeland Security and Emergency Management* 7. Available at http://resiliencesystem.com/sites/default/files/Cutter_jhsem.2010.7.1.1732.pdf, accessed March 20, 2023.

h **Fraser:** Fraser, T. , 2021, "Japanese Social Capital and Social Vulnerability Indices: Measuring Drivers of Community Resilience 2000–2017." *International Journal of Disaster Risk Reduction*. Available at https://www.sciencedirect.com/science/article/pii/S2212420920314679?casa_token=oaC86lYRuwgAAAAA:ChyrqLcLG-4TT_ZqxEMMDP9oFyRMJODxQ6To9x5yfaLmZxYOMUb4qc3Ulx1UdteBCftuEd7d, accessed March 20, 2023.

i **Nursey-Bray:** Nursey-Bray, M., Gillanders, B., & Maher, J. A., 2021, "Developing Indicators for Adaptive Capacity for Multiple Use Coastal Regions: Insights from the Spencer Gulf, South Australia." *Ocean & Coastal Management*. Available at https://www.sciencedirect.com/science/article/pii/S0964569121002118?casa_token=ofxgFiTUUE0AAAAA:qsHc0N1BtTDG NR4w5PhI6g9B_QGfpCj1y-GaF1CottH2i3eLEsQzPKLGC40C39LABoed8qmK,accessed March 20, 2023.

j  RCI: Kathryn A. Foster, 2014, "Resilience Capacity Index,  Disaster Resilience Measurements: Stocktaking of Ongoing Efforts in Developing Systems for Measuring Resilience, *United Nations Development Programme*, 38. Available at https://www.preventionweb.net/files/37916_disasterresiliencemeasurementsundpt.pdf, accessed March 20, 2023.

k  RCRI: Feldmeyer, D., Wilden, D., Jamshed, A., & Birkmann, J., 2020, "Regional Climate Resilience Index: A Novel Multimethod Comparative Approach for Indicator Development, Empirical Validation and Implementation." *Ecological indicators*. Available at https://www.sciencedirect.com/science/article/pii/S1470160X20307998?casa_token=_VRVTAEajgU AAAAA:pTCr0FbuAU7 Y7mjURGNV44_JYPRbhjy2cqxNXdiDcGhwt6SE-IUfzKFQQopJ0pKyZ2wwwTYB, accessed March 20, 2023.

l  SoVI: Cutter, Susan L., Bryan J. Boruff and W. Lynn Shirley., 2003, "Social Vulnerability to Environmental Hazards." *Social Science Quarterly 84.2*. Available at https://onlinelibrary.wiley.com/doi/abs/10.1111/1540-6237.8402002, accessed March 20, 2023.

m  SVI: Barry E. Flanagan, et al., 2011, "A Social Vulnerability Index for Disaster Management," *Journal of Homeland Security and Emergency Management* 8. Available at https://svi.cdc.gov/Documents/Data/A%20Social%20Vulnerability%20Index%20for%20Disaster%20 Management.pdf,  accessed March 20, 2023.

n  TCRI: T. Perfrement and T. Lloyd, 2015, "The Resilience Index: The Modelling Tool to Measure and Improve Community Resilience to Natural Hazards," *The Resilience Index*. Available at https://theresilienceindex.weebly.com/our-solution.html, accessed March 20, 2023.

# Correlation Analysis

The research team conducted a correlation analysis to measure and describe the strength and direction of the relationships among the 22 commonly used community resilience indicators. Correlation analysis shows how individual indicators may be related to each other. Understanding these correlations will help communities design resilience strategies that take these relationships into account.

The Pearson Correlation Coefficient[12] is a numerical measure of linear correlation from −1 to 1.

- A coefficient closer to 1 indicates a positive correlation (variable A increases as variable B increases).
- A coefficient of 0 indicates no correlation.
- A coefficient closer to −1 indicates a negative correlation (variable A increases as variable B decreases).

As jurisdictions consider strategies to address those indicators that reveal challenges to resilience, they should consider relationships between indicators signifying populations that may face multiple challenges. For example, campaigns focusing on individuals that are unemployed should also consider that they are more likely to be single-parent households, have difficulty speaking English, lack a high school diploma, and be without access to a vehicle.

The table below (next page) summarizes some highlights of the county correlation analysis.

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[12] Stangroom, J. "Pearson Correlation Coefficient Calculator." Social Science Statistics.
http://www.socscistatistics.com/tests/pearson/.

## Table 45: Highlighted County Correlation Relationships

| Indicator | Positively Correlates With | Negatively Correlates With |
|---|---|---|
| Age (adults over 65) | ▪ No smartphone (r = 0.45) | ▪ Limited English Speaking (r = -0.26)<br>▪ Household Income (r = -0.25) |
| Low Educational Attainment | ▪ Poverty (r = 0.62)<br>▪ No health insurance (r = 0.47) | ▪ Household Income (r = -0.55)<br>▪ Medical Professional Capacity<br>▪ (r = -0.44) (access to healthcare) |
| Disability | ▪ No smartphone (r = 0.52)<br>▪ Presence of mobile homes (r = 0.45)<br>▪ Poverty (r = 0.47) | ▪ Household Income (r = -0.64)<br>▪ Medical Professional Capacity<br>▪ (r = -0.31) (access to healthcare) |
| Limited English Speaking | ▪ Low educational attainment (r = 0.41) | ▪ Age over 65 (r = -0.26) |
| No Health Insurance | ▪ Low educational attainment (r = 0.47)<br>▪ Presence of mobile homes (r = 0.35) | ▪ Medical Professional Capacity<br>▪ (r = -0.35) (access to healthcare)<br>▪ Home Ownership (r= -0.24)<br>▪ Household Income (r= -0.26) |
| No Vehicle | ▪ Poverty (r = 0.43)<br>▪ Unemployment rate (r = 0.43)<br>▪ Single-parent household (r = 0.38) | ▪ Home ownership (r = -0.35)<br>▪ Household income (r = -0.26)<br>▪ Population change (r = -0.31) |
| Unemployment Rate | ▪ Unemployed women (r = 0.86)<br>▪ Poverty (r = 0.65)<br>▪ Single-parent household (r = 0.51) | ▪ Household Income (r = -0.42)<br>▪ Home ownership (r = -0.27) |
| Household Income | ▪ Medical Professional Capacity (r = 0.40) (access to healthcare)<br>▪ Home ownership (r = 0.35) | ▪ No smartphone (r = -0.62)<br>▪ Disability (r = -0.64)<br>▪ Low Educational Attainment (r = -0.55) |
| Single-Parent Household | ▪ Poverty (r = 0.61)<br>▪ Unemployment rate (r = 0.51)<br>▪ Income inequality (r = 0.43)<br>▪ Unemployed women (r = 0.44) | ▪ Household Income (r = -0.48)<br>▪ Home Ownership (r = -0.31) |
| Presence of Mobile Homes | ▪ Low educational attainment (r = 0.43)<br>▪ Disability (r = 0.45) | ▪ Household income (r = -0.42)<br>▪ Medical professional capacity<br>▪ (r = -0.37) (access to healthcare) |
| Unemployed Women | ▪ Single-Parent Household (r = 0.44)<br>▪ Poverty (r = 0.58) | ▪ Household income (r = -0.36)<br>▪ Home Ownership (r = -0.22) |

| Indicator | Positively Correlates With | Negatively Correlates With |
|---|---|---|
| No Smartphone | <ul><li>Disability (r = 0.52)</li><li>Poverty (r = 0.47)</li><li>Age over 65 (r = 0.45)</li></ul> | <ul><li>Household income (r = -0.62)</li><li>Medical professional capacity</li><li>(r = -0.30) (access to healthcare)</li></ul> |
| Poverty | <ul><li>Low educational attainment</li><li>(r = 0.62)</li><li>Unemployment rate (r = 0.65)</li><li>Single-parent household (r = 0.61)</li><li>Unemployed women (r = 0.58)</li></ul> | <ul><li>Household income (r = -0.75)</li><li>Homeownership (r = -0.38)</li></ul> |

In the tables below, the positive correlations have green shading, and the negative correlations have blue. Values that are too small to have statistical significance are marked with an asterisk.

## Correlation Analysis: County

| | Age over 65 | Low Educational Attainment | Disability | Limited English Speaking | No Health Insurance | No Vehicle | Unemployment Rate | Household Income | Income Inequality | Home Ownership | Single-Parent Household | Presence of Mobile Homes | Medical Professional Capacity | Number of Hospitals | No Affiliation with a Religion | Presence of Civic and Social Organizations | Population Change | Inactive Voters | Unemployed Women | Employment in Dominant Sector | No Smartphone | Poverty |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Age over 65 | 1.00 | -0.14 | 0.38 | -0.26 | -0.17 | -0.13 | -0.06 | -0.25 | 0.06 | -0.10 | -0.09 | 0.11 | -0.08 | -0.02* | 0.04 | 0.03* | 0.24 | -0.07 | -0.07 | -0.07 | 0.45 | -0.02* |
| Low Educational Attainment | -0.14 | 1.00 | 0.40 | 0.41 | 0.47 | 0.29 | 0.41 | -0.55 | 0.26 | -0.21 | 0.44 | 0.43 | -0.44 | -0.05 | -0.14 | -0.27 | -0.21 | 0.08 | 0.38 | -0.03* | 0.37 | 0.62 |
| Disability | 0.38 | 0.40 | 1.00 | -0.20 | 0.07 | 0.15 | 0.35 | -0.64 | 0.23 | -0.18 | 0.32 | 0.45 | -0.31 | -0.05 | 0.02* | -0.14 | 0.02* | 0.10 | 0.29 | -0.03* | 0.52 | 0.47 |
| Limited English Speaking | -0.26 | 0.41 | -0.20 | 1.00 | 0.32 | 0.12 | 0.04 | 0.09 | 0.05 | -0.16 | 0.04 | -0.04 | -0.13 | 0.01* | -0.13 | -0.05 | -0.16 | 0.08 | 0.06 | 0.02* | -0.16 | 0.04 |
| No Health Insurance | -0.17 | 0.47 | 0.07 | 0.32 | 1.00 | 0.09 | 0.11 | -0.26 | 0.12 | -0.24 | 0.22 | 0.35 | -0.35 | -0.04 | -0.19 | -0.21 | -0.02* | 0.06 | 0.07 | -0.09 | 0.06 | 0.22 |
| No Vehicle | -0.13 | 0.29 | 0.15 | 0.12 | 0.09 | 1.00 | 0.43 | -0.26 | 0.32 | -0.35 | 0.38 | -0.04 | -0.09 | 0.05 | 0* | 0.04 | -0.31 | 0.09 | 0.36 | 0.17 | 0.21 | 0.43 |
| Unemployment Rate | -0.06 | 0.41 | 0.35 | 0.04 | 0.11 | 0.43 | 1.00 | -0.42 | 0.34 | -0.27 | 0.51 | 0.14 | -0.22 | 0.03* | 0.09 | -0.10 | -0.11 | 0.14 | 0.86 | 0* | 0.23 | 0.65 |
| Household Income | -0.25 | -0.55 | -0.64 | 0.09 | -0.26 | -0.26 | -0.42 | 1.00 | -0.37 | 0.35 | -0.48 | -0.42 | 0.40 | 0.03* | 0.11 | 0.15 | 0.18 | -0.10 | -0.36 | -0.08 | -0.62 | -0.75 |
| Income Inequality | 0.06 | 0.26 | 0.23 | 0.05 | 0.12 | 0.32 | 0.34 | -0.37 | 1.00 | -0.35 | 0.43 | 0.13 | 0.01* | 0.02* | -0.10 | -0.09 | -0.10 | 0.10 | 0.30 | 0.09 | 0.18 | 0.50 |
| Home Ownership | -0.10 | -0.21 | -0.18 | -0.16 | -0.24 | -0.35 | -0.27 | 0.35 | -0.35 | 1.00 | -0.31 | -0.09 | 0.25 | -0.02* | 0.04 | 0.04 | 0.22 | -0.14 | -0.22 | -0.14 | -0.18 | -0.38 |
| Single-Parent Household | -0.09 | 0.44 | 0.32 | 0.04 | 0.22 | 0.38 | 0.51 | -0.48 | 0.43 | -0.31 | 1.00 | 0.27 | -0.19 | 0.04 | -0.09 | -0.12 | -0.21 | 0.10 | 0.44 | 0.02* | 0.22 | 0.61 |

Community Resilience Indicator Analysis: 2023 Update

| | Age over 65 | Low Educational Attainment | Disability | Limited English Speaking | No Health Insurance | No Vehicle | Unemployment Rate | Household Income | Income Inequality | Home Ownership | Single-Parent Household | Presence of Mobile Homes | Medical Professional Capacity | Number of Hospitals | No Affiliation with a Religion | Presence of Civic and Social Organizations | Population Change | Inactive Voters | Unemployed Women | Employment in Dominant Sector | No Smartphone | Poverty |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Presence of Mobile Homes | 0.11 | 0.43 | 0.45 | -0.04 | 0.35 | -0.04 | 0.14 | -0.42 | 0.13 | -0.09 | 0.27 | 1.00 | -0.37 | -0.06 | 0.03* | -0.22 | 0.06 | 0.01* | 0.12 | -0.03* | 0.31 | 0.26 |
| Medical Professional Capacity | -0.08 | -0.44 | -0.31 | -0.13 | -0.35 | -0.09 | -0.22 | 0.40 | 0.01* | 0.25 | -0.19 | -0.37 | 1.00 | 0.06 | 0.02* | 0.18 | 0.09 | -0.03* | -0.19 | 0.17 | -0.30 | -0.32 |
| Number of Hospitals | -0.02* | -0.05 | -0.05 | 0.01* | -0.04 | 0.05 | 0.03* | 0.03* | 0.02* | -0.02* | 0.04 | -0.06 | 0.06 | 1.00 | -0.01* | 0.07 | -0.03* | 0.02* | 0.02* | 0.04 | -0.02* | 0* |
| No Affiliation with a Religion | 0.04 | -0.14 | 0.02* | -0.13 | -0.19 | 0* | 0.09 | 0.11 | -0.10 | 0.04 | -0.09 | 0.03* | 0.02* | -0.01* | 1.00 | 0.07 | 0.21 | 0.06 | 0.06 | 0* | 0.01* | -0.06 |
| Presence of Civic and Social Organizations | 0.03* | -0.27 | -0.14 | -0.05 | -0.21 | 0.04 | -0.10 | 0.15 | -0.09 | 0.04 | -0.12 | -0.22 | 0.18 | 0.07 | 0.07 | 1.00 | -0.06 | -0.04 | -0.12 | 0.09 | -0.06 | -0.19 |
| Population Change | 0.24 | -0.21 | 0.02* | -0.16 | -0.02* | -0.31 | -0.11 | 0.18 | -0.10 | 0.22 | -0.21 | 0.06 | 0.09 | -0.03* | 0.21 | -0.06 | 1.00 | -0.07 | -0.08 | -0.28 | -0.18 | -0.21 |
| Inactive Voters | -0.07 | 0.08 | 0.10 | 0.08 | 0.06 | 0.09 | 0.14 | -0.10 | 0.10 | -0.14 | 0.10 | 0.01* | -0.03* | 0.02* | 0.06 | -0.04 | -0.07 | 1.00 | 0.13 | 0.03* | -0.02* | 0.11 |
| Unemployed Women | -0.07 | 0.38 | 0.29 | 0.06 | 0.07 | 0.36 | 0.86 | -0.36 | 0.30 | -0.22 | 0.44 | 0.12 | -0.19 | 0.02* | 0.06 | -0.12 | -0.08 | 0.13 | 1.00 | -0.04 | 0.17 | 0.58 |
| Employment in Dominant Sector | -0.07 | -0.03* | -0.03* | 0.02* | -0.09 | 0.17 | 0* | -0.08 | 0.09 | -0.14 | 0.02* | -0.03* | 0.17 | 0.04 | 0* | 0.09 | -0.28 | 0.03* | -0.04 | 1.00 | 0.11 | 0.10 |
| No Smartphone | 0.45 | 0.37 | 0.52 | -0.16 | 0.06 | 0.21 | 0.23 | -0.62 | 0.18 | -0.18 | 0.22 | 0.31 | -0.30 | -0.02* | 0.01* | -0.06 | -0.18 | -0.02* | 0.17 | 0.11 | 1.00 | 0.47 |
| Poverty | -0.02* | 0.62 | 0.47 | 0.04 | 0.22 | 0.43 | 0.65 | -0.75 | 0.50 | -0.38 | 0.61 | 0.26 | -0.32 | 0* | -0.06 | -0.19 | -0.21 | 0.11 | 0.58 | 0.10 | 0.47 | 1.00 |

*Not statistically significant

Positive relationships are positive numbers and have green shading

Negative relationships are negative numbers and have blue shading

## Correlation Analysis: Census Tract

| | Age over 65 | Low Educational Attainment | Disability | Limited English Speaking | No Health Insurance | No Vehicle | Unemployment Rate | Household Income | Income Inequality | Home Ownership | Single-Parent Household | Presence of Mobile Homes | Medical Professional Capacity | Number of Hospitals | No Affiliation with a Religion | Presence of Civic and Social Organizations | Population Change | Inactive Voters | Unemployed Women | Employment in Dominant Sector | No Smartphone | Poverty |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Age over 65 | 1.00 | -0.18 | 0.39 | -0.17 | -0.20 | -0.07 | -0.06 | 0* | 0.16 | 0.26 | -0.08 | 0.15 | 0.08 | 0.01 | 0.08 | 0.07 | 0.17 | -0.08 | -0.07 | 0.06 | 0.35 | -0.14 |
| Low Educational Attainment | -0.18 | 1.00 | 0.25 | 0.56 | 0.56 | 0.29 | 0.31 | -0.47 | 0.10 | -0.29 | 0.32 | 0.18 | -0.39 | -0.02 | -0.10 | -0.14 | -0.14 | 0.13 | 0.27 | -0.03 | 0.30 | 0.51 |
| Disability | 0.39 | 0.25 | 1.00 | -0.09 | 0.11 | 0.19 | 0.26 | -0.50 | 0.19 | -0.08 | 0.31 | 0.29 | -0.22 | 0.01 | 0.02 | 0.03 | 0.09 | -0.03 | 0.18 | 0.09 | 0.54 | 0.39 |
| Limited English Speaking | -0.17 | 0.56 | -0.09 | 1.00 | 0.39 | 0.31 | 0.13 | -0.16 | 0.08 | -0.30 | 0.11 | -0.08 | -0.17 | 0* | -0.07 | -0.13 | -0.24 | 0.13 | 0.15 | 0* | -0.01* | 0.23 |
| No Health Insurance | -0.20 | 0.56 | 0.11 | 0.39 | 1.00 | 0.09 | 0.16 | -0.40 | 0.02 | -0.24 | 0.25 | 0.19 | -0.28 | -0.02 | -0.17 | -0.15 | 0.09 | -0.01 | 0.15 | -0.07 | 0.13 | 0.34 |
| No Vehicle | -0.07 | 0.29 | 0.19 | 0.31 | 0.09 | 1.00 | 0.30 | -0.27 | 0.34 | -0.51 | 0.35 | -0.14 | -0.12 | 0.03 | -0.05 | 0.05 | -0.35 | 0.06 | 0.23 | 0.20 | 0.24 | 0.44 |
| Unemployment Rate | -0.06 | 0.31 | 0.26 | 0.13 | 0.16 | 0.30 | 1.00 | -0.31 | 0.18 | -0.24 | 0.35 | 0.01 | -0.22 | 0.04 | -0.02 | -0.05 | -0.13 | 0.08 | 0.77 | 0.10 | 0.21 | 0.48 |
| Household Income | 0* | -0.47 | -0.50 | -0.16 | -0.40 | -0.27 | -0.31 | 1.00 | -0.23 | 0.47 | -0.48 | -0.24 | 0.40 | -0.02 | 0.05 | -0.02 | -0.04 | 0.03 | -0.24 | 0.01* | -0.48 | -0.62 |
| Income Inequality | 0.16 | 0.10 | 0.19 | 0.08 | 0.02 | 0.34 | 0.18 | -0.23 | 1.00 | -0.31 | 0.21 | 0.03 | 0.01 | 0.03 | -0.06 | 0.02 | -0.11 | 0.04 | 0.14 | 0.10 | 0.23 | 0.39 |
| Home Ownership | 0.26 | -0.29 | -0.08 | -0.30 | -0.24 | -0.51 | -0.24 | 0.47 | -0.31 | 1.00 | -0.37 | 0.13 | 0.23 | -0.05 | 0.04 | -0.01 | 0.20 | -0.13 | -0.20 | -0.04 | -0.06 | -0.49 |
| Single-Parent Household | -0.08 | 0.32 | 0.31 | 0.11 | 0.25 | 0.35 | 0.35 | -0.48 | 0.21 | -0.37 | 1.00 | 0.01 | -0.22 | 0.04 | -0.10 | -0.02 | -0.10 | 0* | 0.27 | 0.09 | 0.24 | 0.53 |
| Presence of Mobile Homes | 0.15 | 0.18 | 0.29 | -0.08 | 0.19 | -0.14 | 0.01 | -0.24 | 0.03 | 0.13 | 0.01 | 1.00 | -0.16 | -0.06 | 0.04 | -0.08 | 0.21 | -0.04 | 0.01 | -0.04 | 0.25 | 0.09 |

Community Resilience Indicator Analysis: 2023 Update

| | Age over 65 | Low Educational Attainment | Disability | Limited English Speaking | No Health Insurance | No Vehicle | Unemployment Rate | Household Income | Income Inequality | Home Ownership | Single-Parent Household | Presence of Mobile Homes | Medical Professional Capacity | Number of Hospitals | No Affiliation with a Religion | Presence of Civic and Social Organizations | Population Change | Inactive Voters | Unemployed Women | Employment in Dominant Sector | No Smartphone | Poverty |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Medical Professional Capacity | 0.08 | -0.39 | -0.22 | -0.17 | -0.28 | -0.12 | -0.22 | 0.40 | 0.01 | 0.23 | -0.22 | -0.16 | 1.00 | 0.03 | -0.02 | 0.06 | -0.01 | -0.03 | -0.19 | 0.23 | -0.22 | -0.32 |
| Number of Hospitals | 0.01 | -0.02 | 0.01 | 0* | -0.02 | 0.03 | 0.04 | -0.02 | 0.03 | -0.05 | 0.04 | -0.06 | 0.03 | 1.00 | -0.03 | 0.16 | -0.07 | 0.04 | 0.02 | 0.03 | 0.02 | 0.04 |
| No Affiliation with a Religion | 0.08 | -0.10 | 0.02 | -0.07 | -0.17 | -0.05 | -0.02 | 0.05 | -0.06 | 0.04 | -0.10 | 0.04 | -0.02 | -0.03 | 1.00 | 0.09 | 0.19 | 0.06 | -0.02 | -0.01 | -0.01* | -0.08 |
| Presence of Civic and Social Organizations | 0.07 | -0.14 | 0.03 | -0.13 | -0.15 | 0.05 | -0.05 | -0.02 | 0.02 | -0.01 | -0.02 | -0.08 | 0.06 | 0.16 | 0.09 | 1.00 | -0.09 | -0.03 | -0.06 | 0.07 | 0.10 | -0.03 |
| Population Change | 0.17 | -0.14 | 0.09 | -0.24 | 0.09 | -0.35 | -0.13 | -0.04 | -0.11 | 0.20 | -0.10 | 0.21 | -0.01 | -0.07 | 0.19 | -0.09 | 1.00 | -0.20 | -0.09 | -0.13 | -0.03 | -0.11 |
| Inactive Voters | -0.08 | 0.13 | -0.03 | 0.13 | -0.01 | 0.06 | 0.08 | 0.03 | 0.04 | -0.13 | 0* | -0.04 | -0.03 | 0.04 | 0.06 | -0.03 | -0.20 | 1.00 | 0.07 | 0* | -0.07 | 0.05 |
| Unemployed Women | -0.07 | 0.27 | 0.18 | 0.15 | 0.15 | 0.23 | 0.77 | -0.24 | 0.14 | -0.20 | 0.27 | 0.01 | -0.19 | 0.02 | -0.02 | -0.06 | -0.09 | 0.07 | 1.00 | 0.05 | 0.15 | 0.37 |
| Employment in Dominant Sector | 0.06 | -0.03 | 0.09 | 0* | -0.07 | 0.20 | 0.10 | 0.01* | 0.10 | -0.04 | 0.09 | -0.04 | 0.23 | 0.03 | -0.01 | 0.07 | -0.13 | 0* | 0.05 | 1.00 | 0.09 | 0.16 |
| No Smartphone | 0.35 | 0.30 | 0.54 | -0.01* | 0.13 | 0.24 | 0.21 | -0.48 | 0.23 | -0.06 | 0.24 | 0.25 | -0.22 | 0.02 | -0.01* | 0.10 | -0.03 | -0.07 | 0.15 | 0.09 | 1.00 | 0.37 |
| Poverty | -0.14 | 0.51 | 0.39 | 0.23 | 0.34 | 0.44 | 0.48 | -0.62 | 0.39 | -0.49 | 0.53 | 0.09 | -0.32 | 0.04 | -0.08 | -0.03 | -0.11 | 0.05 | 0.37 | 0.16 | 0.37 | 1.00 |

*Not statistically significant

Positive relationships are positive numbers and have green shading

Negative relationships are negative numbers and have blue shading