**Name**: Residential Segregation

**Short Description**: The Index of Concentration at the Extremes (ICE) is measure of economic and racial/ethnic spatial polarization and proxy for residential segregation, defined as the difference between the percent of the total population that is high-income and majority versus low-income and minority in a population.

**Data Source(s)**:

* Name: United States Census Bureau, American Community Survey (ACS)
* Link to Source: <https://www.census.gov/programs-surveys/acs/data.html>

**Year(s):** 2019 5-year estimates (2015-2019)

**Source Geographic Level**: Zip Code Tabulation Area (ZCTA)

**Stratification**: Not applicable (We note that the measure calculation utilizes income data stratified by race/ethnicity.)

**Selection Rationale:** Residential segregation is a persistent marker of structural racism and has resulted in a racial wealth gap and opportunity gap between segregated communities. Poverty and socioeconomic disparities have a significant impact on mental health. In the United States there is a persistent racial wealth gap[[1]](#footnote-2) and widening income inequality.[[2]](#footnote-3) This residential segregation measure is calculated using the Index of Concentration at the Extremes (ICE), a method for quantifying the spatial distribution of socioeconomic polarization that captures both income and race disparities that exist within a population. Exploring the interplay of this relationship is essential to understanding the effect of structural racism on population mental health.

**Strengths and Limitations**:

* **Strengths**:
  + [*Equity*] The ICE methodology can effectively measure spatial social polarization at the neighborhood level, capturing insights into social and economic relationships that influence health inequities in a single measure. Traditional tools for measuring income inequality (like the Gini coefficient) or residential segregation (like the Index of Dissimilarity) are not designed to capture the *interaction* between income and race,[[3]](#footnote-4) nor are they suitable for evaluating geographic variations for small areas, like ZCTAs.
  + [*Importance*] The detrimental effect of income inequality on health is well-documented in the literature, both for overall health outcomes[[4]](#footnote-5) and mental health in particular.[[5]](#footnote-6) This relationship may be exacerbated by social inequity embedded within the structures of society through structural racism. For these reasons, it is important to measure the interaction between income and spatial social polarization to best understand its impact on the mental health of a community.
  + [*Relevance and Usability*] The ICE has proven to be effective in measuring health disparities in outcomes like hypertension, pre-term birth, and various mortality measures.[[6]](#footnote-7)
  + [*Scientific Soundness*] ACS data provides valid and reliable estimates of household income data. The ICE score can be easily calculated from these data, and ICE has been validated as an effective public health monitoring tool.[[7]](#footnote-8)
  + [*Feasibility*] The ACS is an ongoing survey that provides data in the year immediately following the year in which they are collected. It produces reliable income data that can be used to calculate an ICE score.
* **Limitations**:
  + [*Scientific Soundness*] The reliability of an ICE score for a particular area depends on the accuracy of income data in that area. It is likely that areas with the most disenfranchised populations will also be those without highly reliable income data.

**Default Weight**:4.3% (*see Weighting Documentation for details on how default weights were assigned*)

**Calculation**:

The ICE output is a number that “ranges from −1 to 1, whereby −1 and 1 respectively connote that 100% of the population is concentrated into the most extreme groups for deprivation and for privilege,” according to both racial make-up and income. A score closer to zero indicates that the population has a more evenly distributed make-up of “privileged” and “deprived” groups.[[8]](#footnote-9)

* *H* = number of high income, majority individuals
* *L* = number of low income, minority individuals
* *T* = total population (including all races and ethnicities)

*Overall Population Calculation:*

* *H* = non-Hispanic White persons making at or above the 80th percentile ($125K) in household income in the last 12 months
* *L* = non-White persons (total population minus White population) making below the 20th percentile ($25K) of household income in the last 12 months
* *T* = total population in the ZCTA (including all races and ethnicities)

ACS tables and variables used:

* Table B19001: Household Income in the Past 12 Months (in 2019 inflation-adjusted dollars)
  + - * B19001\_001: Estimate Total
      * B19001\_002: Estimate Total: Less than $10,000
      * B19001\_003: Estimate Total: $10,000 to $14,999
      * B19001\_004: Estimate Total: $15,000 to $19,999
      * B19001\_005: Estimate Total: $20,000 to $24,999
* Table B19001H: Household Income in the Past 12 Months (in 2019 inflation-adjusted dollars) (White alone, not Hispanic of Latino Householder)
  + - * B19001H\_002: Estimate Total: Less than $10,000
      * B19001H\_003: Estimate Total: $10,000 to $14,999
      * B19001H\_004: Estimate Total: $15,000 to $19,999
      * B19001H\_005: Estimate Total: $20,000 to $24,999
      * B19001H\_015: Estimate Total: $125,000 to $249,999
      * B19001H\_016: Estimate Total: $150,000 to $199,999
      * B19001H\_017: Estimate Total: $200,000 or more

*Black Population Calculation:*

* *H* = non-Hispanic White persons making at or above the 80th percentile ($125K) in household income in the last 12 months
* *L* = non-Hispanic Black or African American persons making below the 20th percentile ($25K) of household income in the last 12 month
* *T* = total population in the ZCTA (including all races and ethnicities)

ACS tables and variables used:

* Table B19001: Household Income in the Past 12 Months (in 2019 inflation-adjusted dollars)
  + - * B19001\_001: Estimate Total
* Table B19001H: Household Income in the Past 12 Months (in 2019 inflation-adjusted dollars) (White alone, not Hispanic of Latino Householder)
  + - * B19001H\_015: Estimate Total: $125,000 to $249,999
      * B19001H\_016: Estimate Total: $150,000 to $199,999
      * B19001H\_017: Estimate Total: $200,000 or more
* Table B19001B: Household Income in the Past 12 Months (in 2019 inflation-adjusted dollars) (Black or African American Alone Householder)
  + - * B19001B\_002: Estimate Total: Less than $10,000
      * B19001B\_003: Estimate Total: $10,000 to $14,999
      * B19001B\_004: Estimate Total: $15,000 to $19,999
      * B19001B\_005: Estimate Total: $20,000 to $24,999

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2. Horowitz, J., Igielnik, R., & Kochhar, R. (2020, January 9). *Trends in U.S. income and wealth inequality*. Pew Research Center’s Social & Demographic Trends Project. <https://www.pewresearch.org/social-trends/2020/01/09/trends-in-income-and-wealth-inequality/> [↑](#footnote-ref-3)
3. Krieger, N., Waterman, P. D., Spasojevic, J., Li, W., Maduro, G., & Van Wye, G. (2016). Public Health Monitoring of Privilege and Deprivation with the Index of Concentration at the Extremes. *American Journal of Public Health*, *106*(2), 256–263. <https://doi.org/10.2105/ajph.2015.302955> [↑](#footnote-ref-4)
4. Pickett, K. E., & Wilkinson, R. G. (2015). Income inequality and health: A causal review. *Social Science & Medicine*, *128*, 316–326. <https://doi.org/10.1016/j.socscimed.2014.12.031> [↑](#footnote-ref-5)
5. Patel, V., Burns, J. K., Dhingra, M., Tarver, L., Kohrt, B. A., & Lund, C. (2018). Income inequality and depression: a systematic review and meta-analysis of the association and a scoping review of mechanisms. *World Psychiatry*, *17*(1), 76–89. <https://doi.org/10.1002/wps.20492> [↑](#footnote-ref-6)
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7. Krieger, N., Kim, R., Feldman, J., & Waterman, P. D. (2018). Using the Index of Concentration at the Extremes at multiple geographical levels to monitor health inequities in an era of growing spatial social polarization: Massachusetts, USA (2010–14). *International Journal of Epidemiology*, *47*(3), 788–819. <https://doi.org/10.1093/ije/dyy004> [↑](#footnote-ref-8)
8. Krieger, N., Kim, R., Feldman, J., & Waterman, P. D. (2018). Using the Index of Concentration at the Extremes at multiple geographical levels to monitor health inequities in an era of growing spatial social polarization: Massachusetts, USA (2010–14). *International Journal of Epidemiology*, *47*(3), 788–819. <https://doi.org/10.1093/ije/dyy004> [↑](#footnote-ref-9)