2023 Food Insecurity Index Methodology

Conduent's Food Insecurity Index was developed by Conduent Healthy Communities Institute (HCI). The Food Insecurity Index is available as part of Conduent's SocioNeeds Index® Suite, which provides analytics around social determinants of health to advance equitable outcomes. Each index summarizes multiple health and socioeconomic indicators into one validated composite score to help identify areas for action.

The SocioNeeds Index Suite can help:
- Justify and validate investments for prevention and early intervention
- Clearly communicate areas for shared action by healthcare, public health, social services, community organizations, business, and others
- Inform policies and interventions at the regional level

Selection and Weighting of Index Components

Conduent HCI reviewed its current library of indicators for component indicators to include in the Food Insecurity Index. Indicators were considered if available at the county, zip code, and census tract level, and updated at least annually. Index components were then scored based on the strength of their Pearson correlation coefficient with selected health outcomes. The indicators that were selected to be included in the Food Insecurity Index are listed in the table below (see *Component Indicators*).

Topic	Component Indicator	Source	Period of Measure
Financial stability	Average Household Expenditure to Average Household Income Ratio	Claritas Consumer Spending Dynamix	2023
Household environment	Female-Headed Single-Parent Households with Children	Claritas Pop-Facts®	2023
Medicaid enrollment	Adults with Medicaid Health Insurance	Claritas Consumer Profiles	2023
Wellness	Percent of Adults who Perceive their Health as Poor	Claritas Consumer Profiles	2023

The percentage of the population eligible for the Supplemental Nutrition Assistance Program (SNAP) was selected as a proxy for the estimation of the population at risk of being food insecure. A regression analysis was performed to measure the strength of the component indicators with the SNAP-eligible population. Component indicators were standardized into Z-scores, in which they were transformed into a z-distribution with a mean value of zero and a standard deviation of one. The final index score was calculated as a weighted average of the component indicator Z-scores. The optimal weighting for each component indicator was determined by examining the Pearson correlation coefficient between the aggregated z-score of component indicators and each outcome indicator. Weights were adjusted until

the optimal coefficients were observed for the association between the index and the outcome indicators.

Outcome Indicator	Locale Type	R^2 value	Pearson Coefficient
SNAP-eligible Population	County	77%	72%

The results of our regression analysis show that 77% of the variation for SNAP-eligible population can be attributed to the Food Insecurity Index. The Pearson correlation coefficient output shows that the association between the index and the outcome indicator is 72% for values when optimal weights are used. The weights listed in the table below are used to calculate the final index values.

Component Indicator	Weights
Average Household Expenditure to Household Income Ratio	26.6%
Female-Headed Single-Parent Households with Children	20.2%
Adults with Medicaid Health Insurance	26.6%
Percent of Adults who Perceive their Health as Poor	26.6%

Based on these weights, *Average Household Expenditure to Household Income Ratio, Adults with Medicaid Health Insurance,* and *Percent of Adults who Perceive their Health as Poor* have the most impact on index values.

Presentation of Index Values Within a Community

Final index values range from 0-100, representing the percentile of each geographic location within the entire United States. Within the community or service area, the index values are grouped into five ranks, where a low rank represents a low level of need and a high rank represents a high level of need. These ranks are determined using natural breaks classification, which groups locations into clusters based on similar index values. This method minimizes the variance within a rank and maximizes the variance between ranks. All locations with a population of over 300 persons, as reported by Claritas population estimates, are included in the Food Insecurity Index. Those with populations under 300 persons are excluded for purposes of data stability.