FEEDING AMERICA

MAP THE MEAL GAP 2022

Technical Brief

An Analysis of County and Congressional District Food Insecurity and County Food Cost in the United States in 2020

MAP THE MEAL GAP

Contents

TECHNICAL BRIEF

The following methodological overview will provide a description of the methods and data used to establish the county- and congressional district-level food insecurity estimates, the food budget shortfall, the cost-of-food index and the average cost of a meal. Following each section, we provide information on the central results for our methods.

RESEARCH GOALS

The primary goal of the *Map the Meal Gap* analysis is to more accurately assess food insecurity at the community level. The methodology undertaken to make this assessment was developed to be responsive to the following questions:

- Is the methodology directly related to the need for food?
  - Yes, it uses the U.S. Department of Agriculture (USDA) food insecurity measure.
- Does it reflect the many determinants of the need for food?
  - Yes, along with income, our model uses information on unemployment rates, median incomes, and other factors that have been shown to be associated with food insecurity. Beginning in 2020, disability prevalence, another key risk factor for food insecurity, was included in the model.
- Can it be broken down by income categories?
  - Yes, we can look at food insecurity for individuals with incomes below and above state-specific thresholds for federal nutrition programs.
- Is it based on well-established, transparent methods?
  - Yes, the methods across the different dimensions are all well established.
- Can we provide the data without taxing the already limited resources of food banks?
  - Yes, the estimates are all established by the Feeding America National Office.
- Can it be consistently applied to all counties in the U.S.?
  - Yes, the estimates rely on publicly available data for all counties (and congressional districts).
- Can it be readily updated on an annual basis?
  - Yes, the publicly available data are released annually.
- Does it allow one to see the potential effect of economic downturns?
  - Yes, by the inclusion of relevant measures of economic health in the models. In response to the novel coronavirus (COVID-19), the *Map the Meal Gap* model was used to develop projections of local-level food insecurity based on predicted changes to unemployment and poverty. More information on this approach can be found here.

SUMMARY OF METHODS

OVERALL AND CHILD FOOD-INSECURITY RATE

METHODOLOGY

We begin by analyzing the state-level relationships between food insecurity and its determinants (i.e., unemployment, poverty, disability, homeownership, and median income) as well as the percentage of the population that is Black and the percentage of the population that is Hispanic. We then use the coefficient estimates from this analysis combined with information on the same variables defined at the county and congressional district levels to generate estimated food insecurity rates for all individuals and for children for every county and congressional district in the country.

DATA SOURCES

The Current Population Survey (CPS) survey data are used to assess the relationship between food insecurity and determinants of food insecurity at the state level. The variables used were selected because of their availability at the county, congressional district, and state level. The following variables are used: unemployment rates, median income, poverty rates, homeownership rates, percent of the population that is African American and percent of the population that is Hispanic. Beginning in 2020, *Map the Meal Gap* also includes disability rates and uses an adjusted poverty variable that excludes college students to better reflect the socioeconomic status of communities irrespective of student populations (described below). County and congressional district level data are drawn from the American Community Survey (ACS), except for unemployment data, which are drawn from the Bureau of Labor Statistics (BLS). For the child food insecurity estimates, we use data restricted to households with children for all variables except the unemployment rate and disability rate, which are defined for the full population of the county.

Map the Meal Gap 2022 Model Updates

For the first time, our 2020 estimates include overall local food insecurity rates by race and ethnicity among the following populations: Black (all ethnicities), Latino (Hispanic), and white, non-Hispanic. The underlying variables used to produce estimates for these groups are consistent with those used to produce overall and child estimates and are specific to each population (e.g., unemployment rate among Black individuals instead of among the overall population). The models used to produce food insecurity estimates for these populations do not include variables reflecting the share of the population that is Black or the share that is Hispanic. Due to smaller sample sizes, estimates for these groups are not available for every state, county or congressional district.

Disaggregating by Race/Ethnicity

Like with overall food insecurity and child food insecurity, we begin, for each race and ethnicity subgroup, by analyzing the state-level relationships between food insecurity and its subgroup-specific determinants (e.g., unemployment for Black individuals, poverty for Black individuals, disability for Black individuals, homeownership for Black individuals, and median income for Black individuals). The subgroup-specific models do not contain variables for the percentage of the population that is Black or the percentage of the population that is Hispanic. We then use the coefficient estimates from this analysis combined with information on the same variables defined at the county and congressional district levels to generate estimated food insecurity rates for all individuals and for children for every county and congressional district in the country. The race and ethnicity subgroup models rely on the same data sources as overall and child food insecurity rates.

Map the Meal Gap 2020 Model Updates

In 2020, Feeding America made two improvements to the model used to estimate local food insecurity. Our estimates now account for disability status and reflect a refined definition of poverty. These changes both improve the accuracy of our estimates and align the model with the most up-to-date research on the key determinants of food insecurity.

Accounting for Disability Status

The first improvement to the model is the inclusion of a variable reflecting the disability status of household members. According to the U.S. Census Bureau, persons with a disability report difficulty with one or more of the following six functions: hearing, vision, cognition, ambulation, self-care, and independent living (U.S. Census Bureau, 2017). Research by the USDA and others has demonstrated that disability status is one of the most important risk factors for whether a household is food insecure (Adams, 2015; Balistreri, 2019; Brown, 2018; Brucker, 2016; Brucker, Brucker, 2017; Brucker & Nord, 2016; Noonan, 2016; Sonik, 2016). The U.S. Census Bureau has been collecting data on disability status for household members since 2009 in the Current Population Survey—long enough to now be considered for inclusion in the model.

Refining the Measure of Poverty

In addition to accounting for disability status, the model now includes a refined poverty variable to more accurately reflect the socioeconomic status of community residents. Research shows that in areas with high proportions of college students, poverty rates are overstated (Benson & Bishaw, 2018). One indicator of this is that the parental income of students attending universities is substantially higher than the national average (Blagg et al., 2017). As a result, the official poverty measure does not accurately reflect the resources available to college students.

We use 5-year estimates from Table B14006 of the ACS to calculate the numerator of the non-student poverty rate by subtracting the number of undergraduate students reporting income below the poverty level from all persons reporting income below the poverty level. We then divide that number by the total population minus all students irrespective of their incomes.

FOOD BUDGET SHORTFALL

METHODOLOGY

Responses from food-insecure households to CPS questions about a food budget shortfall are calculated at the individual level and then averaged to arrive at a weekly food budget shortfall of $17.25. As

discussed in *Household Food Security in the United States in 2020* (Coleman-Jensen et al., 2021), households experiencing food insecurity experience this condition, on average, seven months of the year.

FI persons * $17.25 * 52 weeks * (7/12) =	$ reported needed by the food insecure to meet their food needs in 2020

DATA SOURCES

The CPS data includes two questions relevant for this determination. First, a question asks if a household needed more, less, or the same amount of money to meet their basic food needs. Second, those that respond "more" are asked an additional question about how much more money they need to meet their basic food needs. These questions are posed after questions about weekly food expenditures but before the food security module.

COST-OF FOOD INDEX

METHODOLOGY

To establish a relative price index that allows for comparability between counties, NielsenIQ assigns every sale of UPC-coded food items in a county to one of the 26 food categories in the USDA Thrifty Food Plan (TFP). These are then weighted to the TFP market basket based on pounds purchased per week by age and gender. For the current analyses, pounds purchased by males age 19 - 50 are examined. While other Thrifty Food Plans for different ages and/or genders may have resulted in different *total* market basket costs, *relative pricing* between counties (our goal for this analysis) would not be affected. The total market basket is then translated into a multiplier that can be applied to any dollar amount. This multiplier differs by county, revealing differences in food costs at the county level.

DATA SOURCES

NielsenIQ provided in-store scanning data and Homescan data.

NATIONAL AVERAGE MEAL COST

METHODOLOGY

The average dollar amount spent on food per week by food-secure individuals is divided by 21 (three meals per day * seven days per week). Food expenditures for *food-secure* individuals were used to ensure that the result reflected the cost of an adequate diet. We then weight the national average cost per meal by the "cost-of-food index" to derive a localized estimate.

DATA SOURCES

Before respondents are asked the food security questions on the CPS, they are asked how much money their household usually spends on food in a week.

FOOD INSECURITY RATE ESTIMATES

METHODS

Full Population of Counties (and Congressional Districts)

We proceed in two steps to estimate the extent of food insecurity in each county. In what follows, the descriptions are for counties but, except where otherwise noted, they also apply to congressional districts. Food insecurity estimates for a given year (e.g., 2020) correspond to the geographical boundaries for that same year (e.g., 2020).

Step 1: Using state-level data from 2009-2020, we estimate a model where the food insecurity rate for individuals at the state level is determined by the following equation:

$$FI_{st} = \alpha + \beta_{UN}UN_{st} + \beta_{POV}POV_{st} + \beta_{MI}MI_{st} + \beta_{HISP}HISP_{st} + \beta_{BLACK}BLACK_{st} + \beta_{OWN}OWN_{st} + \beta_{DSBL}DSBL_{st} + \mu_t + \upsilon_s + \varepsilon_{st} \quad (1)$$

where *s* is a state, *t* is year, *UN* is the unemployment rate, *POV* is the poverty rate, *MI* is median income, *HISP* is the percent Hispanic, *BLACK* is the percent African-American, *OWN* is the percent of individuals who are homeowners, *DSBL* is the percent of individuals who report a disability, μ_t is a year fixed effect, υ_s is a state fixed effect, and ε_{st} is an error term. This model is estimated using weights defined as the state population. The set of questions used to identify whether someone is food insecure, i.e., living in a food-insecure household, are defined at the household level. A household is said to be food insecure if the respondent answers affirmatively to three or more questions from the Core Food Security Module (CFSM) in the December Supplement of the CPS for the years 2009-2020. A complete list of questions in the CFSM is found in APPENDIX C.

Our choice of variables was first guided by the literature on the determinants of food insecurity. We included variables found in prior research to influence the probability of someone being food insecure. (For an overview of that literature in this context see Gundersen & Ziliak, 2018.) Next, we chose variables that are available both in the CPS and at the county level, such as those in the American Community Survey (ACS) or other sources (described below). The model does not include variables that are not available at both the state and county level.

Of course, these variables do not portray everything that could potentially affect food-insecurity rates. In response, we include the state and year fixed effects noted above, which allow us to control for unobserved state-specific and year-specific influences on food insecurity.

Step 2: We use the coefficient estimates from *Step 1* plus information on the same variables defined at the county level to generate estimated food insecurity rates for individuals defined at the county level. This can be expressed in the following equation:

$$FI^*_c = \hat{\alpha} + \widehat{\beta_{UN}}UN_c + \widehat{\beta_{POV}}POV_c + \widehat{\beta_{MI}}MI_c + \widehat{\beta_{HISP}}HISP_c + \widehat{\beta_{BLACK}}BLACK_c + \widehat{\beta_{OWN}}OWN_c + \widehat{\beta_{DSBL}}DSBL_c + \widehat{\mu_{2018}} + \hat{\upsilon}_s \quad (2)$$

where *c* denotes a county. The variables *POV*, *MI*, *HISP*, *BLACK*, *OWN* and *DISBL* are based on 2016-2020 ACS 5-year estimates for the county-level models and from 2016-2020 5-year estimates for the congressional district-level models.[1] The variable *UN* is based on 2020 BLS 1-year averages for the

[1] We have historically used 1-year ACS data to produce food insecurity estimates for congressional districts, but the U.S. Census Bureau did not release 2020 1-year ACS data in 2022 due to data quality concerns related to Covid-19.

county-level estimates and 2016-2020 ACS 5-year estimates for the congressional district estimates.[2] From our estimation of *(2)*, we calculate both food insecurity rates and the number of food-insecure persons in a county. The latter is defined as $FI^*_c * N_c$ where N is the population.

The overall and child models used in Map the Meal Gap have historically included race and ethnicity to implicitly account for the structural and institutional discrimination that underlies these differences in food insecurity for the two largest minority groups in the United States (i.e., Black and Latino). Including these variables may account for significant risk factors that affect communities of color beyond what is accounted for in the other variables in the model. Methodologically, we include these two variables because they meet the criteria that we have laid out for inclusion in the model. Other populations of color, such as Native Americans and some Asian nationalities are also disproportionately affected by food insecurity; however, sample size and data availability have prevented us from including additional racial and/or ethnic representation in the model. All this said, Feeding America is investing in an independent analysis of the inclusion of the race and ethnicity variables in the Map the Meal Gap model.

Income Bands within Counties (and Congressional Districts)

Food insecurity rates are also estimated for those above and below each state's Supplemental Nutrition Assistance Program (SNAP) and National School Lunch Program (NSLP) income eligibility threshold (see APPENDIX A for a list of SNAP and NSLP thresholds for each state). In this case, we continue to proceed with a two-step estimation method. The structure of the equations is slightly different than above. Equation *(1)* is instead specified as follows:

$$FIC_{st} = \alpha + \beta_{UN} UN_{st} + \beta_{HISP} HISP_{st} + \beta_{BLACK} BLACK_{st} + \beta_{OWN} OWN_{st} + \beta_{DSBL} DSBL_{st} + \mu_t + \upsilon_s + \varepsilon_{st} \quad (1')$$

and equation *(2)* is specified as:

$$FIC^*_c = \hat{\alpha} + \widehat{\beta_{UN}} UN_c + \widehat{\beta_{HISP}} HISP_c + \widehat{\beta_{BLACK}} BLACK_c + \widehat{\beta_{OWN}} OWN_C + \widehat{\beta_{DSBL}} DSBL_c + \widehat{\mu_{2018}} + \hat{v_s} \quad (2')$$

Equation *(1')* is estimated through limiting the sample to those with incomes within a particular income range (e.g., below 130 percent of the poverty line) but *UN*, *BLACK*, *HISP*, *OWN*, and *DISBL* are defined for all individuals. We do so since these variables are only available in the ACS for all income levels. We estimate FIC based on households below each of the thresholds noted in TABLE 1. With this information, we proceed with the follows. First, we identify the number of food insecure persons with incomes below each of the thresholds. Second, the number of food insecure persons with incomes above each of the thresholds is defined as the total number of food insecure persons minus the number of food insecure persons below that threshold. Third, the remaining number of food insecure persons are defined as between those two thresholds.

A simple example for a county with a SNAP threshold of 160% of the poverty line helps to illustrate this. Suppose in a county of 100,000 persons: 20,000 persons are identified as food insecure, 14,000 are identified as food insecure with incomes below 160% of the poverty line and 16,000 are identified as food insecure with incomes below 185% of the poverty line. In this case, there are 14,000 food insecure persons with incomes under 160% of the poverty line; 2,000 with incomes between 160% and 185% of the poverty line (i.e., 16,000-14,000); and 4,000 with incomes above 185% of the poverty line (i.e., 20,000-16,000). These are then expressed as percentages: 70% below 160% of the poverty line (i.e.,

[2] We have historically used 1-year ACS data for unemployment at the congressional-district-level.

14,000/20,000), 10% between 160% and 185% of the poverty line (i.e., 2,000/20,000), and 20% above 185% of the poverty line (i.e., 4,000/20,000). In states where the gross income threshold for SNAP is 185% or 200% of the poverty line, there are only two categories: above and below that threshold.

Each of the estimates for the number of food insecure persons below a certain threshold is done independently of each other. In a very small number of counties this leads to the total number of food-insecure people that are estimated to be below the lower threshold and above the higher threshold (e.g., 160% and 185%) being greater than the total number of food insecure people for that county. This would imply that there are no food insecure persons between the thresholds, which is unlikely to be the case. As a result, starting with *Map the Meal Gap 2019*, we take the county estimate of the number of food insecure persons below the lower threshold (e.g., 160% of the poverty line) directly from our model but the proportion and subsequent number of food insecure persons between the two thresholds (e.g., 160% and 185% of the poverty line) is taken from the population weighted average of all counties in the state. The remaining number of food insecure persons in that county (if any) are in the over 185% of the poverty line category.

Estimated food insecurity rates by income bands within congressional districts were estimated using the same methods.

Black, Latino, and White Populations of Counties (and Congressional Districts)

Consistent with the approach we use to generate local food insecurity estimates for the overall and child populations at the county and congressional district levels, we use a two-step process to estimate the percentage of certain racial/ethnic groups that live in food-insecure households.

In the first step, individual state-level files from the Current Population Survey (CPS) are created separately for Black individuals; white, non-Hispanic individuals; and Hispanic individuals. This is based on two sets of questions. The first set of questions ask whether a respondent is of Hispanic, Latino or Spanish origin along with more details, and the second set ask about race. An individual is categorized as Black if they select “Black or African American” as their only race. Said another way, individuals reporting multiple races including “Black” would not be included in the estimates, although persons reporting that they are “Black” may be Hispanic or non-Hispanic. An individual is categorized as “white, non-Hispanic” if they only report “white” for their race and “non-Hispanic” to the question about Hispanic ethnicity. A person is designated as “Hispanic” if they report “Hispanic” to the question about Hispanic ethnicity, although the person may be of any race. Consequently, the data for the racial and ethnic groups are not mutually exclusive.

Then, unemployment data by race/ethnicity from the Bureau of Labor Statistics (BLS) are merged to the files with the CPS data. Data for the years 2009-2020 are created for each subgroup.

Disaggregating data can lead to smaller samples, which can consequently lead to less accurate estimates. We have taken some precautions to address this issue: “State year” observations are dropped 1) where there are fewer than 10 unweighted observations in the CPS and 2) in years for which unemployment information is not available from BLS. States with six or fewer years were dropped. For Black individuals, this results in the following states being dropped from the analyses: Hawaii, Idaho, Maine, Montana, North Dakota, South Dakota, Utah, Vermont, and Wyoming. For Hispanic individuals, the following states

were dropped: Maine, North Dakota, Vermont, and West Virginia. For white non-Hispanic individuals, all states were included.

Next, separately for each of the three racial/ethnic subgroups, state-level food insecurity is regressed on the subgroup-specific independent variables: the poverty rate, unemployment rate, median income, homeownership rate, and disability rate. The state-level coefficients from these regressions are then applied to subgroup-specific data at the county and congressional district level from the American Community Survey (ACS) to estimate the local subgroup-specific food insecurity rate. Note that the poverty rate used in our race/ethnicity estimates is not the non-student poverty variable used to estimate overall and child food insecurity since the latter variable isn't available by subgroup. Rather, the overall poverty rate for each specific subgroup is used.

Additionally, we drop observations where any of the independent variables in the ACS have missing values or where their values are 0% or 100% (except for median income, which is only dropped if it is missing). We drop those with values of 0% or 100% because there is a discontinuity at those values—an indication that those data are not accurate. For example, there are seven counties where Hispanic individuals face an unemployment rate of 0.3%, five where the rate is 0.2%, two where it is 0.1%, and 604 where it is 0%. Additionally, counties where values of 0% or 100% occur tend to be smaller. For example, the average size of the 604 counties with Hispanic unemployment rates of 0% is 505 persons while the average Hispanic population in counties with unemployment rates above 0% is 26,917.

Finally, we also drop observations with populations below 500 people.

There are two main differences between the models for race and ethnicity and the other models used in Map the Meal Gap to estimate local food insecurity among the overall and child populations.

First, the race/ethnicity models do not include the percent Black or the percent Hispanic as covariates, whereas the overall and child models currently do. For the results for white, non-Hispanic individuals, the covariate cannot be included because by design, there are no Hispanic or Black individuals in the sample. For the results for Hispanic individuals, these variables are not included because the overwhelming majority of Latino individuals also identify as white—less than 4% of Latino individuals also identify as Black in the past 10 years. The same reasoning holds for Black individuals. We will continue to explore the inclusion and exclusion of these variables in the model in the coming months and years.

Secondly, the model for race and ethnicity uses the overall subgroup-specific poverty rate in both stages of the estimation process, while the overall and child Map the Meal Gap model uses the non-undergraduate poverty rate at the ACS stage. Currently, the data to construct the non-undergraduate poverty rate by subgroup is not available in the ACS. This difference won't affect results for most counties, although in the counties where there is a high undergraduate population and a high proportion of the relevant sub-population the estimated subgroup-specific food insecurity rates to be slightly higher than they otherwise would have been when using the non-undergraduate poverty rate.

Child Populations of Counties (and Congressional Districts)

To estimate child food insecurity rates at the county and congressional district levels, we proceed in essentially the same manner as for the full population. However, a few notes are needed regarding the specific procedures used for child food insecurity.

First, we define the variables for households with children rather than for all households. For example, the poverty rate is defined only for households with children. The only exception is for the unemployment rate and disability prevalence variables, which are defined for all households. We made this decision because the sub-state unemployment rates as constructed by BLS are not broken down by whether or not an adult lives in a household where children are present and the ACS.

Second, we define child food insecurity in the following manner. There are three measures of food insecurity related to children (Coleman-Jensen et al. 2021, Table 1B). The one we use, is "children in food-insecure households," which includes children residing in households experiencing low or very low food security among children, adults, or both. To be in this category, a household with children must respond affirmatively to at least three of the 18 questions in the CFSM in the CPS. The count of children who are food insecure is based on the number of children in food-insecure households, and the food insecurity rate is the ratio of the number of children in food-insecure households to the total number of children in the relevant geographic area. (This measure is distinct from two other measures found in Coleman-Jensen et al. (2021): households with food insecure children and households with very low food secure children, albeit all children falling into either of these two categories would also be categorized as being in a food insecure household.)

Third, due to the smaller sample sizes for children, we do not break things down in the same income bands as with the full population. Instead, we break the analyses down in accordance with the threshold for free or reduced-price lunches in the NSLP. Unlike for SNAP thresholds, this cutoff is the same for all states.

DATA

The information at the state level (i.e., the information used to estimate equations *(1)* and *(1')*) is derived from the CFSM in the December Supplement of the CPS for the years 2009-2020. While the CFSM has been on the CPS since 1996, we draw from this time range because it reflects the inclusion of the disability status question within the CPS.

The CPS is a nationally representative survey conducted by the Census Bureau for the Bureau of Labor Statistics, providing employment, income, and poverty statistics. In December of each year, 50,000 households respond to a series of questions on the CFSM (full questionnaire is found in APPENDIX C), in addition to questions about food spending and the use of government and community food assistance programs. Households are selected to be representative of civilian households at the state and national levels and thus do not include information on individuals living in group quarters, including dormitories on college campuses, nursing homes, or assisted living facilities. Using information on all persons in the CPS for which we had information on (a) income and (b) food insecurity status, we aggregated information up to the state level for each year to estimate equation *(1)*. We aggregated in a similar manner for equation *(1')*; however, only those below a defined income threshold were used in this aggregation. As noted above, the values for the full sample for the other variables outside of income are used.

Use of Data at the County and Congressional District Level

For information at the county level (i.e., the information used to estimate equations *(2)* and *(2')*), we used information from the 2016-2020 ACS 5-year estimates and 2020 BLS 1-year unemployment. The ACS is a sample survey of three million addresses administered by the Census Bureau. In order to

provide estimates for areas with small populations, this sample was defined over a five-year period. The unemployment rate at the county level, however, is from 2020.

For information at the congressional district level, including unemployment data (i.e., the information used to estimate equation *(2)*), we used information from the 2016-2020 ACS 5-year estimates. Unlike in previous years, we do not use one year data for congressional districts since this was not released for 2020 due to data quality concerns.

For both county and congressional districts, ACS data were drawn from tables B14006 (non-undergraduate student poverty rate), C17002 (ratio of income to poverty level), B19013 (median income), DP04 (homeownership rate), DP05 (percent African American and percent Hispanic), and S1810 (disability rate). For congressional districts, unemployment data were drawn from S2301. All 3,143 counties and county equivalents provided by the Census Bureau were included in the analysis.

For race and ethnicity estimates. ACS data were drawn from S1701 (subgroup-specific poverty rates), S1903 (subgroup-specific median income), B25003B (homeownership rate for Black individuals), B25003I (homeownership rate for Hispanic individuals), B25003H (homeownership rate for white, non-Hispanic individuals), and S1810 (subgroup-specific disability rate).

For information at the child level, ACS data were drawn from tables B14006 (poverty), B17024 (ratio of income to poverty level), B19125 (household median income), B01001I (number of Hispanic children), B01001B (number of African American children), B25115 (homeownership), and S1810 (disability rate) For congressional districts, child data tables are the same as those used for the county-level data with the exception of percent Hispanic and African American children, which were pulled from S1901.

RESULTS

We now turn to a brief discussion of the results from the estimation of equation *(1)* and *(1')*. These results for the full population are presented in TABLE 1. In this table, we present coefficient estimates for selected variables and the corresponding standard errors for the full population and for various income categories.

Concentrating on column (1), as expected, the effects of unemployment, poverty and disability prevalence are especially strong. Holding all else constant, a one percentage point increase in the unemployment rate leads to a 0.486 percentage point increase in food insecurity, while a one percentage point increase in the poverty rate leads to a 0.342 percentage point increase. Furthermore, holding all else constant, a one percentage point increase in the disability rate leads to a 0.186 percentage point increase in food insecurity. The results for the various income categories (i.e., columns (2) through (6)) are broadly similar to those found for the full population.

In TABLE 2, we present the results for children and in TABLE 3, we present the results for Black individuals, Latino individuals, and white, non-Hispanic individuals.

In 2020, we conducted a series of tests of the *Map the Meal Gap* results to see how well the models performed. Our tests included the following: we compared county results aggregated to metropolitan areas with food-insecurity values for these metro areas taken from the CPS; we compared county results averaged over several years for counties that are observed in the CPS; we compared results with and without state fixed effects; we compared county results aggregated to the state level with food

insecurity values for states taken from the CPS; and we compared predicted results from our model at the national level with actual food-insecurity rates per year. (For a broader discussion of *Map the Meal Gap* along with information on some further analyses of the robustness of the *Map the Meal Gap* results, see Gundersen et al., 2014 and Gundersen et al., 2017.)

Trends in Local Food Insecurity Rates since 2011

Food insecurity estimates from *Map the Meal Gap* 2022 (2020 data) may be compared to data from *Map the Meal Gap* 2021 (2019 data) and *Map the Meal Gap* 2020 (2018 data). As noted above, however, 2020 estimates for congressional districts and states were calculated using ACS 5-year (2016-20) data, not the ACS 1-year data used in previous studies since the Census Bureau did not release 2020 ACS 1-year data in 2022 due to data quality concerns related to Covid-19; as a result, 2020 and 2019 food insecurity estimates for congressional districts and states are not directly comparable. We do not recommend comparing food insecurity estimates from either of these years to data from *Map the Meal Gap* 2019 (2017 data) or any previous year due to the aforementioned changes in the methodology made in 2020 (i.e., updated poverty variable and new disability variable). Estimates from *Map the Meal Gap* 2013 (2011 data) through *Map the Meal Gap* 2019 (2017 data) are more directly comparable.

FOOD BUDGET SHORTFALL

METHODS

To better understand the food needs of the food-insecure population, we sought to estimate the shortfall in their food budgets. To do so, we use the following question taken from the CPS Food Security Supplement:

In order to buy just enough food to meet (your needs/the needs of your household), would you need to spend more than you do now, or could you spend less?

This question is asked prior to the 18 questions used to derive the food-insecurity measure and, consequently, is not influenced by their responses about food insecurity. Out of those responding "more," the following question is posed:

About how much MORE would you need to spend each week to buy just enough food to meet the needs of your household?

Restricting the sample to households experiencing food insecurity over the previous 12 months, and assigning a value of "0" to households that report needing zero dollars (i.e., those who could spend "the same" each week), as well as to those that report needing "less money", we divide by the number of people in the household to arrive at a per-person figure of $17.25 per week. This value is denoted as PPC.

Not all food-insecure households reported needing additional food every day of the week. The phrasing of the questions above, however, suggests that responses are given with respect to a week during which the household needed to "spend more." Therefore, we have assumed that these responses incorporate both the days of the week during which the household was able to meet its food needs and the days of the week where more money was needed. This assumption is supported by the dollar amount reported, which amounts to approximately 5.3 meals per week (assuming three meals per day, this is fewer than two days per week). The inclusion of food-insecure households that reported needing $0 more per week also supports this assumption. These respondents were assumed to be responding from the perspective of a recent week, one in which they did not require additional money.

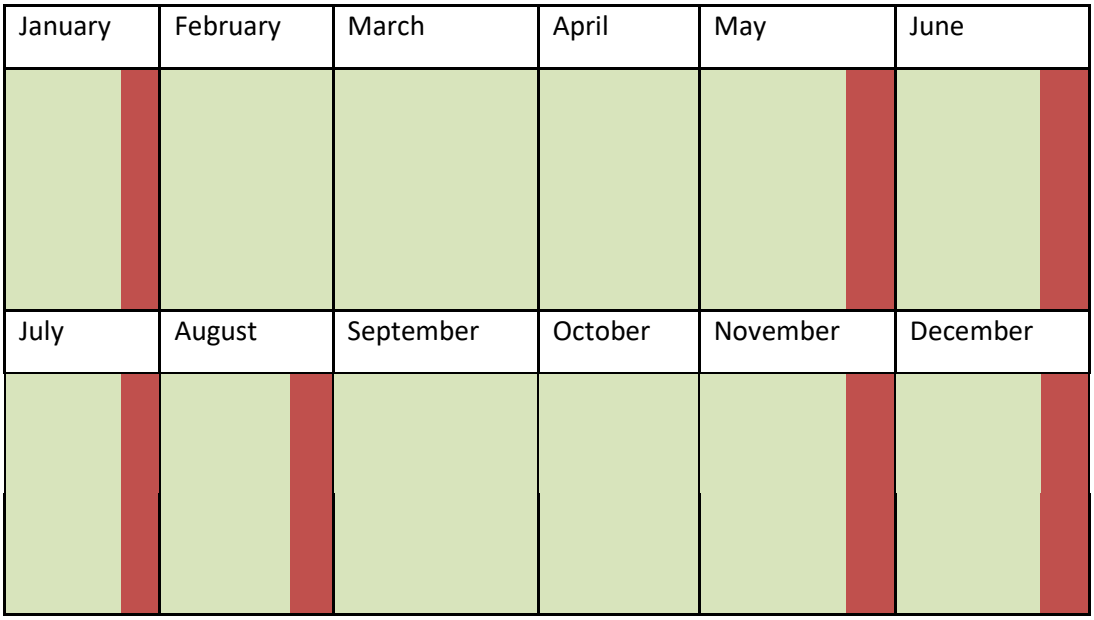
Visually, this theoretical week would then look like this:

Day 1	**Day 2**	**Day 3**	**Day 4**	**Day 5**	**Day 6**	**Day 7**
With enough food	With enough food	With enough food	With enough food	With enough food	In need of food	In need of food

Similar to how households do not experience food insecurity every day of the month in which they report food insecurity, households may not experience food insecurity every month of the year. As reported by the USDA, in the annual report *Household Food Security in the United States*, "on average,

households that were food insecure at some time during the year were food insecure in 7 months of the year" (Coleman-Jensen et al., 2021, pg. 13).

Visually, using the above illustration as a typical week, a sample year would look like this:



With this information, we are then able to calculate the dollar figure needed per county, per year as follows: $PPC*52*(7/12)*FI^{*}_{cs}*N_{cs}$. This calculation incorporates the number of weeks in a year (52) and the average number of months of the year in which someone experiences food insecurity (7 out of 12).

DATA

To calculate the dollars needed for a food-insecure person to meet their food needs, we used information from the 2020 CPS.

RESULTS

In developing the results for the amount of money needed by a food-insecure person to meet weekly food needs, we examined additional possible values, including those for (1) households experiencing food insecurity any time over the prior 12 months and (2) households experiencing food insecurity any time over the prior 30 days. We further broke this analysis down for (a) a sample of those responding "more" or "the same" to the first question above and (b) a sample of those responding "more" to the first question. Households responding "less" were included in these analyses and coded as "zero".

The value of $17.25 was selected because it was the most conservative result and because it was the result most similar to the difference in per-person weekly food expenditures between food-secure and food-insecure households.

In TABLE 4, we present some descriptive statistics about reports of dollars needed to be food secure from the CPS. As done above, we restrict the sample to those reporting food insecurity. In the first column, we present results on individuals and in the second column, we present results for households. The average cost to be food secure in 2020 was $17.25 per-person per week. When we break things

down further by household size, income levels and food-insecurity levels, the results are consistent with expectations. Namely, larger households report needing more money to be food secure than smaller households; individuals with lower incomes report needing more money to be food secure than individuals with higher incomes; and individuals in households with higher levels of food insecurity need more money to be food secure than households with lower levels of food insecurity.

COST-OF-FOOD INDEX

METHODS

Because the amount of money needed to be food secure is established as a national average, it does not reflect the range of that figure's food-purchasing power at the local level. To estimate the *local* food budget shortfall, we worked with NielsenIQ to incorporate differences in the price of food that exist between counties. To do so, NielsenIQ designed custom product characteristics so that UPC codes for all food items could be mapped to one of the 26 categories described in the USDA's Thrifty Food Plan (TFP). This is based on 26 categories of food items (examples include "all potato products", "fruit juices" and "whole fruits.") Each UPC-coded food item (non-food items, such as vitamins, were excluded) was assigned to one of the categories. Random-weight food items (such as loose produce or bulk grains) were not included but packaged fresh produce, such as bagged fruits and vegetables, were included. Prepared meals were categorized as a whole (rather than broken down by ingredients) and were coded to "frozen or refrigerated entrees." Processed foods (such as granola bars, cookies, etc.) were coded to "sugars, sweets, and candies" or "non-whole grain breads, cereal, rice, pasta, pies, pastries, snacks, and flours" as appropriate.

The cost to purchase a market basket of these 26 categories is then calculated for each county. Sales of all items within each category were used to develop a cost-per-pound of food items in that category. Some categories, such as milk, are sold in a volume unit of measure and not in an ounces unit of measure. Volume unit of measures were converted to ounces by using "FareShare Conversion Tables". Each category was priced based on the pounds purchased per week as defined by the TFP for each of 26 categories by age and gender. We used the weights in pounds for purchases by males 19 - 50 years for this analysis. Other age/gender weights may have resulted in different total market basket costs but are unlikely to have affected relative pricing between counties, which was the goal of the analysis. (The TFP does have 29 categories, but three categories are weighted as 0.0 lbs. for this age/gender grouping. These include "popcorn and other whole grain snacks," "milk drinks and milk desserts," and "soft drinks, sodas, fruit drinks, and -ades (including rice beverages.)")

The methods used by NielsenIQ do not, in general, include all stores selling food in a county in the annual sample they use to construct the market basket described above. In counties with sufficient population size and corresponding number of stores selling food, the non-inclusion of some stores is unlikely to bias the cost of the market basket. However, in small counties, the exclusion of some or even all stores can lead to pricing of the market basket that is not an accurate reflection of the "true cost." Along with some stores being excluded, some of the stores included may be too small to have sufficient sales of products included in the market basket. In response to these biases, for all counties with less than 20,000 persons, we ascertain the cost of a market basket that is based on the average of prices found in that county and the prices of the contiguous counties. To request a full list of counties for which cost data were imputed, please email research@feedingamerica.org.

To accurately reflect the prices paid at the register by consumers, food sales taxes are integrated into the market basket prices. County-level food taxes include all state taxes and all county taxes levied on grocery items. Within some counties, municipalities may levy additional grocery taxes. Because these taxes are not consistently applied across the county and we do not calculate food prices at the sub-county level, they are not included. Taxes on vending machine food items or prepared foods were not included, as the market baskets do not incorporate those types of foods. For state-level market basket

costs, the average of the county-level food taxes was used. Twelve states levy grocery taxes. An additional six states do not levy state-level grocery taxes but do permit counties to levy a grocery tax. Finally, an additional state does not levy state or county-level grocery taxes but does permit municipalities to levy grocery taxes (more detail about the tax rates used can be found in APPENDIX B).

As suggested above, our interest is in the relative rather than the absolute price of the TFP, so using the value of the TFP (VTFP), we then calculate an index (IVTFP) as follows: $IVTFP = VTFP_{cs}/AVTP$ where AVTP is the weighted average value of the TFP across all counties. We then estimate the annual food budget shortfall among all food insecure persons (AFBS) that incorporates these price differences. This is calculated for each county as $AFBS_{cs} = IVTFP_{cs}*PPC*52*(7/12)*FI_{cs}*N_{cs}$.

DATA

To calculate the differences in food costs across counties, we used information from the NielsenIQ Scantrack service. This includes prices paid for each UPC code in over 65,000 stores across the U.S. All these analyses use data from a 52-week period ending October 2020 (end of month). Previous versions used 4 weeks of data instead of 52, but the period was changed due to sample size issues.

NATIONAL AVERAGE MEAL COST

METHODS

With the above information, we have calculated a localized food budget shortfall for all food-insecure individuals in a county area. In many situations, however, food banks have found it useful and meaningful to discuss the "meals" or "meal equivalents" represented by these dollar values. To meet this need, we calculated an approximation of the number of meal equivalents represented by the county-level food budget shortfall as follows.

In the CPS there is a question that asks how much a household usually spends on food in a week:

Now think about how much (you/your household) USUALLY (spend/spends). How much (do you/does your household) USUALLY spend on food at all the different places we've been talking about IN A WEEK? (Please include any purchases made with SNAP or food stamp benefits).

Restricting the sample to households that are food secure, constructing this sample on a per-person basis, and dividing by 21 (i.e., the usual number of meals a person eats), we arrive at a per-meal cost of $3.25. We restricted the sample to food-secure households to ensure that the per-meal cost was based on the experiences of those with the ability to purchase a food-secure diet.

Using this information, the number of meals needed in a county can then be calculated as $MAFBScs = (IVTFP_{cs}*PPC*52*(7/12)*FI^{*}_{cs}*N_{cs})/(IVTFP_{cs}*3.25)$.

It is important to note that the "meal gap" is descriptive of a food budget shortfall, rather than a literal number of meals.

DATA

To calculate the average meal cost, we used information from the 2020 CPS.

REFERENCES

Adams E, Hoffman L, Rosenberg K, Peters D, Pennise M. Increased food insecurity among mothers of 2 year olds with special health care needs. *Maternal and Child Health Journal* 2015;19:2206-2214. Retrieved from https://pubmed.ncbi.nlm.nih.gov/25682114/

Balistreri K. Food insufficiency and children with special healthcare needs. *Public Health* 2019;167:55-61. Retrieved from https://pubmed.ncbi.nlm.nih.gov/30639804/

Benson, C. & Bishaw, A. (2018). When many college students live off campus, poverty rate goes up. Retrieved from https://www.census.gov/library/stories/2018/10/off-campus-college-students-poverty.html

Blagg, K., Gundersen, C., Schanzenbach, D., & Ziliak, J. (2017). Assessing food insecurity on campus: A national look at food insecurity among America's college students. Urban Institute. Retrieved from https://www.urban.org/sites/default/files/publication/92331/assessing_food_insecurity_on_campus_0.pdf

Brown P, Durham D, Tivis R, Stamper S, Waldren C, Toevs S, Gordon B, Robb T. Evaluation of food insecurity in adults and children with cystic fibrosis: Community case study. *Frontiers in Public Health* 2018;6:10.3389/fpubh.2018.00348. Retrieved from https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6275191/

Brucker D. (2016). Food insecurity among young adults with disabilities in the United States: Findings from the National Health Interview Survey. *Disability and Health Journal*; 9:298-305. Retrieved from https://pubmed.ncbi.nlm.nih.gov/26632027/

Brucker D, Coleman-Jensen A. (2017). Food insecurity across the adult life span for persons with disabilities. *Journal of Disability Policy Studies*;28(2):109-118. Retrieved from https://scholars.unh.edu/iod_chhs/48/

Brucker D, Nord D. (2016). Food insecurity among young adults with intellectual and developmental disabilities in the United States: Evidence from the National Health Interview Survey. *AJIDD-American Journal on Intellectual and Developmental Disabilities*;121(6):520-532. Retrieved from https://pubmed.ncbi.nlm.nih.gov/27802103/

Coleman-Jensen A., M. P. Rabbitt, C. Gregory, & A. Singh. (2021). Household food security in the United States in 2020. Washington DC: U.S. Department of Agriculture, Economic Research Report No. 298. Retrieved from https://www.ers.usda.gov/publications/pub-details/?pubid=102075

Gundersen, C. & J. Ziliak. (2018). Food insecurity research in the United States: Where we have been and where we need to go. *Applied Economic Perspectives and Policy* 40(1), 119-135. Retrieved from https://academic.oup.com/aepp/article/40/1/119/4863698

Gundersen, C., E. Engelhard, & E. Waxman. (2014). Map the Meal Gap: Exploring food insecurity at the local level. *Applied Economics Policy and Perspectives*, 36(3), 373-386. Retrieved from https://academic.oup.com/aepp/article-abstract/36/3/373/2730548?redirectedFrom=fulltext

Gundersen, C., A. Dewey, M. Hake, E. Engelhard, & A. Crumbaugh. (2017). Food insecurity across the rural/urban divide: Are counties in need being reached by charitable food assistance? *The ANNALS of the American Academy of Political and Social Science* 672(1), 217-236. Retrieved from https://experts.illinois.edu/en/publications/food-insecurity-across-the-rural-urban-divide-are-counties-in-nee

Noonan K, Corman H, Reichman N. (2016). Effects of maternal depression on family food insecurity. *Economics and Human Biology*;22:201-215. Retrieved from https://www.nber.org/papers/w20113

Sonik R, Parish S, Ghosh S, Igdalsky L. (2016). Food insecurity in US households that include children with disabilities. *Exceptional Children*;83(1):42-57. Retrieved from https://journals.sagepub.com/doi/abs/10.1177/0014402916651847

U.S. Census Bureau. (2017). How disability data are collected from the American Community Survey. Retrieved from https://www.census.gov/topics/health/disability/guidance/data-collection-acs.html

TECHNICAL APPENDICES

APPENDIX A: SNAP AND NSLP THRESHOLDS

To be most useful for planning purposes, Supplemental Nutrition Assistance Program (SNAP) thresholds effective by January 1, 2022 were used for all states in this analysis. SNAP thresholds provided are the gross income eligibility criteria as established by the state. Applicants must meet other criteria (such as net income and asset criteria) in order to receive the SNAP benefit. Children in households receiving SNAP are categorically eligible for such programs as free National School Lunch Program (NSLP). In states with a SNAP threshold lower than 185 percent of the poverty line, persons earning between the SNAP threshold and 185 percent of the poverty line are income-eligible for other nutrition programs such as the reduced-price NSLP, Special Supplemental Nutrition Program for Women, Infants, and Children (WIC), etc.

State	SNAP Threshold	Other Nutrition Program Threshold (if applicable)
AK	130%	185%
AL	130%	185%
AR	130%	185%
AZ	185%	
CA	200%	
CO	200%	
CT	185%	
DC	200%	
DE	200%	
FL	200%	
GA	130%	185%
HI	200%	
IA	160%	185%
ID	130%	185%
IL	165%	185%
IN	130%	185%
KS	130%	185%
KY	200%	
LA	130%	185%
MA	200%	
MD	200%	
ME	185%	
MI	200%	
MN	165%	185%
MO	130%	185%
MS	130%	185%
MT	200%	
NC	200%	
ND	200%	
NE	165%[3]	185%
NH	185%	
NJ	185%	
NM	165%	185%
NV	200%	
NY	200%	
OH	130%	185%
OK	130%	185%
OR	200%[4]	
PA	160%	185%
RI	185%	
SC	130%	185%
SD	130%	185%
TN	130%	185%
TX	165%	185%
UT	130%	185%
VA	130%	185%
VT	200%[5]	
WA	200%	
WI	200%	
WV	200%	
WY	130%	185%

[3] In 2021, Nebraska changed their gross income eligibility threshold from 130% to 165% of the poverty line.
[4] In 2021, Oregon changed their gross income eligibility threshold from 185% to 200% of the poverty line.
[5] In 2021, Vermont changed their gross income eligibility threshold from 185% to 200% of the poverty line.

APPENDIX B: FOOD TAX RATES

States not listed in this appendix do not levy grocery taxes and do not permit counties or municipalities to levy grocery taxes (with the exception of Alaska and Hawaii). In some cases, municipalities may levy additional grocery taxes. These taxes were not included in this analysis. A full list of individual counties' rates is not provided here but is available upon request.

Twelve states levy grocery taxes. In the following three states, no additional grocery taxes are levied at the individual county level. Any additional taxes levied by municipalities were excluded from this analysis.

State	2020 Food Tax (state rate)
ID	6.0%
MS	7.0%
SD	4.5%

In the following nine states, additional grocery taxes are levied at the county or municipal level. Only those rates levied at the county and state level were incorporated into this analysis.

State	2020 Food Tax (state rate)	2020 Food Tax (weighted county average)	2020 Total Food Tax (state + county)
AL	4.00%	1.97%	5.97%
AR	0.13%	1.39%	1.52%
IL	1.00%	0.71%	1.71%
KS	6.50%	1.13%	7.63%
MO	1.23%	1.99%	3.21%
OK	4.50%	0.70%	5.20%
TN	4.00%	2.47%	6.47%
UT	1.75%	1.25%	3.00%
VA	1.50%	1.00%	2.50%

An additional six states do not levy state-level grocery taxes but do permit counties and municipalities to levy a grocery tax.[6]

State	2019 Food Tax (state rate)	2019 Food Tax (weighted county average)
AK	0%	0.93%
CO	0%	0.25%
GA	0%	3.32%
LA	0%	2.89%
NC	0%	2.00%
SC	0%	0.74%

[6] Arizona does not levy state or county-level grocery taxes but does permit municipalities to levy grocery taxes. As a result, no taxes were factored into the food-cost index. It is worth noting, however, that additional burden may be placed on residents of municipalities in which food taxes are in effect.

APPENDIX C: FOOD INSECURITY QUESTIONS IN THE CORE FOOD SECURITY MODULE

ASKED OF ALL HOUSEHOLDS

1. "We worried whether our food would run out before we got money to buy more." Was that **often, sometimes**, or never true for you in the last 12 months?

2. "The food that we bought just didn't last and we didn't have money to get more." Was that **often, sometimes**, or never true for you in the last 12 months?

3. "We couldn't afford to eat balanced meals." Was that **often, sometimes**, or never true for you in the last 12 months?

4. In the last 12 months, did you or other adults in the household ever cut the size of your meals or skip meals because there wasn't enough money for food? (**Yes**/No)

5. In the last 12 months, did you ever eat less than you felt you should because there wasn't enough money for food? (**Yes**/No)

6. (If yes to Question 4) How often did this happen—**almost every month, some months but not every month**, or in only 1 or 2 months?

7. In the last 12 months, were you ever hungry, but didn't eat, because you couldn't afford enough food? (**Yes**/No)

8. In the last 12 months, did you lose weight because you didn't have enough money for food? (**Yes**/No)

9. In the last 12 months did you or other adults in your household ever not eat for a whole day because there wasn't enough money for food? (**Yes**/No)

10. (If yes to Question 9) How often did this happen—**almost every month, some months but not every month**, or in only 1 or 2 months?

ONLY ASKED OF HOUSEHOLDS WITH CHILDREN

11. "We relied on only a few kinds of low-cost food to feed our children because we were running out of money to buy food." Was that **often, sometimes**, or never true for you in the last 12 months?

12. "We couldn't feed our children a balanced meal, because we couldn't afford that." Was that **often, sometimes**, or never true for you in the last 12 months?

13. "The children were not eating enough because we just couldn't afford enough food." Was that **often, sometimes**, or never true for you in the last 12 months?

14. In the last 12 months, did you ever cut the size of any of the children's meals because there wasn't enough money for food? (**Yes**/No)

15. In the last 12 months, were the children ever hungry but you just couldn't afford more food? (**Yes**/No)

16. In the last 12 months, did any of the children ever skip a meal because there wasn't enough money for food? (**Yes**/No)

17. (If yes to Question 16) How often did this happen—**almost every month, some months but not every month**, or in only 1 or 2 months?

18. In the last 12 months did any of the children ever not eat for a whole day because there wasn't enough money for food? (**Yes**/No)

Note: Responses in bold indicate an affirmative response.

TABLES

TABLE 1: Estimates of the Impact of Various Factors on Food Insecurity, State Level, 2009-2020

	Full Population	<130% of the poverty line	<160% of the poverty line	<165% of the poverty line	<185% of the poverty line	<200% of the poverty line
	coefficient	coefficient	coefficient	coefficient	coefficient	coefficient
	(s.e.)	(s.e.)	(s.e.)	(s.e.)	(s.e.)	(s.e.)
Poverty Rate	0.342**					
	(0.052)					
Unemployment Rate	0.486**	1.133**	0.960**	0.961**	1.015**	0.912**
	(0.093)	(0.277)	(0.237)	(0.238)	(0.226)	(0.215)
Median Income	-0.001					
	(0.002)					
Percent Hispanic	-0.052	-0.077	-0.024	-0.028	-0.028	-0.074
	(0.063)	(0.190)	(0.164)	(0.163)	(0.156)	(0.145)
Percent African-American	-0.056	-0.037	-0.061	-0.046	-0.155	-0.122
	(0.068)	(0.216)	(0.185)	(0.184)	(0.175)	(0.167)
Percent Homeownership	-0.071*	-0.152	-0.120	-0.129	-0.123	-0.162
	(0.033)	(0.116)	(0.095)	(0.094)	(0.087)	(0.083)
Percent Disabled	0.186**	0.476**	0.400**	0.423**	0.462**	0.397**
	(0.058)	(0.167)	(0.142)	(0.142)	(0.136)	(0.130)
2010 (year fixed effect)	-0.009*	-0.009	-0.010	-0.001	-0.016	-0.012
	(0.004)	(0.011)	(0.010)	(0.010)	(0.009)	(0.009)
2011 (year fixed effect)	-0.008*	-0.005	0.005	0.005	-0.004	0.001
	(0.004)	(0.011)	(0.010)	(0.010)	(0.009)	(0.009)
2012 (year fixed effect)	-0.008*	0.009	0.001	0.006	0.002	0.000
	(0.004)	(0.011)	(0.010)	(0.010)	(0.009)	(0.008)
2013 (year fixed effect)	-0.004	0.023*	0.007	0.018	0.015	0.012

	(0.004)	(0.012)	(0.011)	(0.011)	(0.010)	(0.010)
2014 (year fixed effect)	-0.004	0.022	0.009	0.018	0.014	0.010
	(0.005)	(0.014)	(0.013)	(0.013)	(0.013)	(0.012)
2015 (year fixed effect)	-0.006	0.027	0.013	0.022	0.012	0.006
	(0.006)	(0.016)	(0.014)	(0.014)	(0.013)	(0.012)
2016 (year fixed effect)	-0.006	0.019	0.006	0.017	0.005	-0.000
	(0.006)	(0.016)	(0.014)	(0.014)	(0.013)	(0.013)
2017 (year fixed effect)	-0.008	0.008	-0.001	0.010	0.000	-0.010
	(0.007)	(0.017)	(0.015)	(0.015)	(0.014)	(0.013)
2018 (year fixed effect)	-0.011	0.004	-0.011	-0.002	-0.009	-0.012
	(0.007)	(0.019)	(0.016)	(0.016)	(0.015)	(0.014)
2019 (year fixed effect)	-0.011	0.004	-0.011	-0.007	-0.021	-0.016
	(0.008)	(0.018)	(0.016)	(0.017)	(0.016)	(0.015)
2020 (year fixed effect)	-0.030**	-0.037**	-0.043**	-0.035**	-0.050**	-0.042**
	(0.006)	(0.013)	(0.012)	(0.012)	(0.011)	(0.011)
Constant	0.105**	0.390**	0.371**	0.363**	0.336**	0.360**
	(0.028)	(0.092)	(0.077)	(0.077)	(0.072)	(0.068)

* p<0.05 ** p<0.01. The omitted year for the year fixed effects is 2009. The data used is taken from the December Supplements of the 2009-2020 Current Population Survey.

TABLE 2: Estimates of the Impact of Various Factors on Child Food Insecurity, State Level, 2009-2020

	Full Population	<185% of the poverty line
	coefficient	coefficient
	(s.e.)	(s.e.)
Poverty Rate	0.253**	
	(0.060)	
Unemployment Rate	0.891**	1.251**
	(0.198)	(0.359)
Median Income	-0.004	
	(0.002)	
Percent Hispanic	0.004	0.003
	(0.062)	(0.133)
Percent Black	0.129	0.014
	(0.074)	(0.164)
Percent Homeownership	-0.057	-0.110
	(0.048)	(0.095)
Percent Disabled	0.296**	0.191
	(0.113)	(0.234)
2010 (year fixed effect)	-0.033**	-0.054**
	(0.008)	(0.013)
2011 (year fixed effect)	-0.029**	-0.037*
	(0.008)	(0.016)
2012 (year fixed effect)	-0.019*	-0.023
	(0.009)	(0.014)
2013 (year fixed effect)	-0.012	-0.004
	(0.009)	(0.015)
2014 (year fixed effect)	-0.011	-0.015
	(0.010)	(0.018)
2015 (year fixed effect)	-0.020	-0.014

	(0.011)	(0.020)
2016 (year fixed effect)	-0.028*	-0.035
	(0.012)	(0.020)
2017 (year fixed effect)	-0.021	-0.028
	(0.014)	(0.021)
2018 (year fixed effect)	-0.027	-0.059*
	(0.015)	(0.026)
2019 (year fixed effect)	-0.034*	-0.067**
	(0.015)	(0.024)
2020 (year fixed effect)	-0.056**	-0.072**
	(0.010)	(0.016)
Constant	0.136**	0.415**
	(0.044)	(0.086)

* p<0.05 ** p<0.01. The omitted year for the year fixed effects is 2009. The data used is taken from the December Supplements of the 2009-2020 Current Population Survey.

TABLE 3: Estimates of the Impact of Various Factors on Sub Group Food Insecurity, State Level, 2009-2020

	FI (all)	FI (White, NH)	FI (Black)	FI (Hispanic)
	coefficient (s.e.)	coefficient (s.e.)	coefficient (s.e.)	coefficient (s.e.)
Poverty Rate	0.342**	0.258**	0.238**	0.215**
	(0.052)	(0.045)	(0.057)	(0.059)
Unemployment Rate	0.486**	0.374**	0.393*	0.073
	(0.093)	(0.095)	(0.189)	(0.191)
Median Income	-0.001	-0.002	-0.008	-0.006
	(0.002)	(0.001)	(0.006)	(0.006)
Percent Hispanic	-0.052			
	(0.063)			
Percent African-American	-0.056			
	(0.068)			
Percent Homeownership	-0.071*	-0.082**	-0.133*	-0.014
	(0.033)	(0.029)	(0.053)	(0.046)
Percent Disabled	0.186**	0.134**	-0.039	0.223*
	(0.058)	(0.048)	(0.090)	(0.096)
2010 (year fixed effect)	-0.009*	-0.008*	-0.010	-0.013
	(0.004)	(0.003)	(0.014)	(0.012)
2011 (year fixed effect)	-0.008*	-0.002	-0.014	-0.019
	(0.004)	(0.004)	(0.015)	(0.012)
2012 (year fixed effect)	-0.008*	-0.001	-0.010	-0.050**
	(0.004)	(0.003)	(0.013)	(0.012)
2013 (year fixed effect)	-0.004	-0.001	0.007	-0.045**
	(0.004)	(0.004)	(0.015)	(0.012)
2014 (year fixed effect)	-0.004	-0.002	0.015	-0.055**
	(0.005)	(0.005)	(0.016)	(0.015)

2015 (year fixed effect)	-0.006	0.000	-0.014	-0.066**
	(0.006)	(0.005)	(0.016)	(0.016)
2016 (year fixed effect)	-0.006	-0.006	-0.000	-0.070**
	(0.006)	(0.005)	(0.018)	(0.016)
2017 (year fixed effect)	-0.008	-0.008	-0.001	-0.074**
	(0.007)	(0.006)	(0.020)	(0.018)
2018 (year fixed effect)	-0.011	-0.011	-0.008	-0.084**
	(0.007)	(0.006)	(0.021)	(0.018)
2019 (year fixed effect)	-0.011	-0.011	-0.020	-0.089**
	(0.008)	(0.006)	(0.022)	(0.020)
2020 (year fixed effect)	-0.030**	-0.031**	-0.014	-0.079**
	(0.006)	(0.004)	(0.017)	(0.016)
Constant	0.105**	0.124**	0.264**	0.230**
	(0.028)	(0.026)	(0.046)	(0.047)

* p<0.05 ** p<0.01. The omitted year for the year fixed effects is 2009. The data used is taken from the December Supplements of the 2009-2020 Current Population Survey.

TABLE 4: Breakdowns of Weekly Cost to be Food Secure (in $) in 2020

	Individuals	Households
All Food Insecure	$17.25	
By Household Size		
1 person		$26.31
2 person		$33.09
3 person		$43.37
4 person		$44.79
5 person		$41.95
By Income Categories		
<130% of poverty line	$18.70	
>130% of poverty line	$15.91	
<185% of poverty line	$17.95	
>185% of poverty line	$15.97	
By food security status		
Marginally food secure	$7.99	
Low food secure	$13.06	
Very low food secure	$24.27	

The data used are taken from the December Supplement of the 2020 Current Population Survey.

161 N. Clark Street, Suite 700
Chicago, Illinois 60601
1.800.771.2303
www.FeedingAmerica.org

Support Feeding America and help solve hunger.
Donate. Volunteer. Advocate. Educate.

Feeding America is a 501 (c)(3) non-profit recognized by the IRS.