FEEDING® AMERICA

MAP THE MEAL GAP 2019

A Report on County and Congressional District Food Insecurity and County Food Cost in the United States in 2017

MAP THE MEAL GAP

CONTENTS

FOREWORD

It is hard to believe that in the United States, 40 million Americans may not know where they will find their next meal. *Map the Meal Gap* provides local estimates of food insecurity and food cost across the nation and brings to light the challenges faced by so many to simply put food on the table.

Map the Meal Gap's strength lies in its ability to initiate conversations, insights and actions across a broad spectrum of hunger-relief partners. Now in its ninth year, the study impacts many aspects of the hunger-relief landscape and is the foundation for evidence-based initiatives, strategies and communications.

Feeding America uses *Map the Meal Gap* to understand and approach the hunger crisis at the local level. It is an invaluable resource that informs our strategic planning and goal-setting as we seek to help households live free from hunger. Additionally, legislators, hunger-relief partners, academics and community organizations use its findings to develop policies, research and programs to address hunger and its related social and economic issues.

As we work to end hunger in America, our path is clear. Together, building on *Map the Meal Gap* as our foundation, we will we continue to develop, test and expand creative hunger-relief initiatives to address domestic hunger and bring more food to people in need.

Feeding America is deeply grateful to The Howard G. Buffett Foundation as Founding Sponsor of *Map the Meal Gap*. On behalf of our network, hunger-relief partners and, most importantly, the people we serve, thank you for your visionary leadership.

Claire Babineaux-Fontenot
Chief Executive Officer
Feeding America

ABOUT FEEDING AMERICA

Feeding America® is the largest hunger-relief organization in the Unites States. Through a network of 200 food banks and 60,000 food pantries and meal programs, we provide meals to more than 46 million people each year. Feeding America also supports programs that prevent food waste and improve food security among the people we serve; educates the public about the problem of hunger; and advocates for legislation that protects people from going hungry.

GLOSSARY

AGENCY

A charitable organization that provides food supplied by a food bank directly to people in need through various types of programs, like food pantries.

AMERICAN COMMUNITY SURVEY (ACS)

A U.S. Census Bureau survey based on a sample of 3 million addresses. ACS data are used to produce *Map the Meal Gap* estimates. In order to provide valid estimates for areas with small populations, the county-level ACS data used in *Map the Meal Gap* were averaged over a five-year period.

AVERAGE MEAL COST

The national average dollar amount food-secure people report spending per week on food, as estimated in the Current Population Survey (CPS), divided by 21 (assuming three meals eaten per day). This number is then adjusted by the cost-of-food index (see below).

CHARITABLE FOOD PROVIDERS

Charitable feeding programs like food pantries, meal programs, kitchens and shelters, whose services are provided to people in times of need.

CHILD FOOD INSECURITY

The household-level economic and social condition of limited or uncertain access to adequate food, as reported for households with children under age 18; it is assessed in the Current Population Survey (CPS) and represented in U.S. Department of Agriculture (USDA) food-security reports.

CHILD FOOD-INSECURITY RATE

The percentage of children living in households in the U.S. that experienced food insecurity at some point during the year. The child food-insecurity estimates in this study are derived from the same questions used by the USDA to identify food insecurity in households with children at the national level.

COST-OF-FOOD INDEX

A measure that uses food price data provided by Nielsen to estimate the relative cost of food in each county. The index consists of county multipliers that reflect the cost (after taxes) of purchasing the equivalent of a USDA Thrifty Food Plan (TFP) market basket relative to the national average. These multipliers are then used to generate local estimates of the national food budget shortfall and average meal cost.

CURRENT POPULATION SURVEY (CPS)

A nationally-representative survey conducted by the U.S. Census Bureau for the Bureau of Labor Statistics (BLS) providing employment, income, food insecurity and poverty statistics. Selected households are representative of civilian households at the state and national levels. The CPS does not include individuals living in group quarters, including nursing homes or assisted living facilities.

FOOD BANK

A charitable organization that solicits, receives, inventories and distributes donated food and grocery products pursuant to industry and appropriate regulatory standards. The products are distributed to charitable social-service agencies, which provide groceries and meals directly to people in need through various charitable feeding programs. Some food banks also distribute food directly to individuals in need.

FOOD BUDGET SHORTFALL

The amount of money per week food-insecure people report needing to meet their food needs, as assessed in the Current Population Survey. This amount is annualized for the purposes of this study.

FOOD INSECURITY

The household-level economic and social condition of limited or uncertain access to adequate food. It is assessed in the Current Population Survey and represented in USDA food-security reports.

FOOD-INSECURITY RATE

The percentage of the population that experienced food insecurity at some point during the year.

HIGH FOOD-INSECURITY COUNTIES

The top 10% of counties with the highest food-insecurity (or child food-insecurity) rates as compared with rates across all counties in the United States.

INCOME ELIGIBILITY THRESHOLD FOR FEDERAL NUTRITION PROGRAMS

A dollar amount tied to the federal poverty line that determines whether a household is income-eligible for federal nutrition programs like the Supplemental Nutrition Assistance Program (SNAP) or the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC). Income eligibility is one aspect of eligibility, which varies by state and include other tests based on assets and net income.

MEAL GAP

The equivalent of the food budget shortfall in meals calculated by dividing the food budget shortfall in a specified area by the average meal cost in that area.

METRO-MICRO AREAS

County-based geographic categories defined by the Office of Management and Budget (OMB). Metropolitan (metro) areas have a core urban area of 50,000 or more residents while micropolitan (micro) areas have a core urban area between 10,000 and 50,000. Metro and micro areas consist of one or more counties and include the counties containing both the core urban area, as well as any adjacent counties that have a high degree of social and economic integration with the urban core. Here we use counties categorized as part of nonmetro areas to broadly define "rural" counties although we analyze food insecurity in micro counties as well.

NONMETRO/RURAL COUNTIES

Counties that are categorized as part of nonmetro areas by the Office of Management and Budget (OMB) and used here to define "rural" counties. Nonmetro counties are located outside the boundaries of metropolitan (metro) areas and are widely used to study conditions in "rural" America. They can be subdivided into micropolitan (micro) and all remaining counties (neither metro nor micro), and further subdivided using USDA ERS Rural-Urban Continuum Codes (RUCCs).

PERCENT OF POVERTY LINE

A multiple of the federally established poverty guideline, which varies based on household size. These percentages are used to set income eligibility thresholds for federal nutrition programs, such as SNAP.

PERSISTENT-POVERTY COUNTY

A term used by the USDA Economic Research Service (ERS) to refer to counties where at least 20 percent of the population has been living in poverty over the last 30 years.

RURAL-URBAN CONTINUUM CODES

A classification scheme used by the USDA that subdivides metro counties into three categories by the population size of their metro area, and nonmetro counties into six categories by degree of urbanization and adjacency to a metro area. Here we use RUCCs to analyze food insecurity across and within metro and nonmetro counties.

SUPPLEMENTAL NUTRITION ASSISTANCE PROGRAM (SNAP)

Formerly known as the Food Stamp Program, SNAP is the largest of the federal nutrition programs and provides qualified recipients with resources, in the form of an electronic payment card, to buy groceries.

ABOUT MAP THE MEAL GAP

We believe that addressing the problem of hunger requires a thorough understanding of the problem. For the ninth consecutive year, Feeding America has undertaken the *Map the Meal Gap* analysis to continue learning about how the face of food insecurity can vary at the local level. By better understanding variations in local need, communities can develop more targeted strategies to better reach people struggling with hunger.

Although Feeding America continually seeks to meet the needs of food-insecure people, quantifying the need for food within a community can be challenging. In September 2018, the United States Department of Agriculture (USDA) Economic Research Service released its most recent food insecurity report, indicating that more than 40 million people in the United States live in food-insecure households, of whom more than 12 million are children (Coleman-Jensen et al., 2018a). While the magnitude of the problem is clear, national and even state estimates of food insecurity can mask the variation that exists at the local level.

Prior to the inaugural *Map the Meal Gap* release in March 2011, Feeding America used national and state-level USDA food-insecurity data to estimate the need. However, the 200 Feeding America member food banks that comprise the network are rooted in their local communities and need specific information at the ground level in order to be responsive to unique local conditions. Many food banks used poverty rates as an indicator of local food needs because it was one of few variables available at the county level. However, national data reveal that about 59% of people struggling with hunger earn incomes above the federal poverty level and 61% of people living in poor households are food secure (Coleman-Jensen et al., 2018b). Measuring need based on local poverty rates alone provides an incomplete illustration of a community's potential need for food assistance. Better community-level food-insecurity data are a valuable and unique resource for informing and engaging community members, leaders and partners in our mission to end hunger through a quantifiable and data-driven approach. In order to do this, *Map the Meal Gap* generates four types of community-level data: overall food-insecurity estimates, child food-insecurity estimates, average meal costs and food budget shortfalls.

RESEARCH GOALS

In developing *Map the Meal Gap*, Feeding America identified several research goals:

- Reflect major known determinants of the need for food.
- Reflect well-established and transparent research methods.
- Provide data that is consistently applied to all U.S. counties
- Avoid taxing the limited resources of food banks.
- Be updated on an annual basis.
- Reflects the potential effect of economic downturns.
- Analyze household income and eligibility for federal nutrition assistance.

METHODOLOGY OVERVIEW

Following is an overview of the methodology for this study. A more detailed description can be found in the technical appendix.

FOOD-INSECURITY ESTIMATES

Before producing county-level estimates, we assess the state-level relationship between food insecurity and associated factors using Current Population Survey (CPS) data supplemented with data from the Bureau of Labor Statistics (BLS). The specific variables used are: unemployment, poverty, homeownership, and other demographic variables that are publicly available at both the county and state level. County-level estimates are derived from the state-level relationships that exist between these variables and food insecurity. Food-insecurity estimates at the county level may vary more from year to year than state or national estimates due to smaller geographies, particularly in counties with very small populations. For that reason, we take efforts to guard against unexpected fluctuations that can occur in these counties by using five-year averages from the American Community Survey (ACS). However, unemployment is based on a one-year average estimate for each county as reported by the BLS. Estimates are sorted by income categories associated with eligibility for federal nutrition programs, such as the Supplemental Nutrition Assistance Program (SNAP), using ACS data on population and income at the county level.

ESTIMATING FOOD INSECURITY AT THE COUNTY LEVEL

Using the annual USDA Food Security Survey, we model the relationship between food insecurity and other variables at the state level and, using information for these variables at the county level, we establish food-insecurity rates by county.

The food-insecurity model demonstrates the relationship between food insecurity and several indicators, including unemployment and poverty.

Food Insecurity Rates

| 4-14% | 15-19% | 20-24% | 25-29% | 30% + |
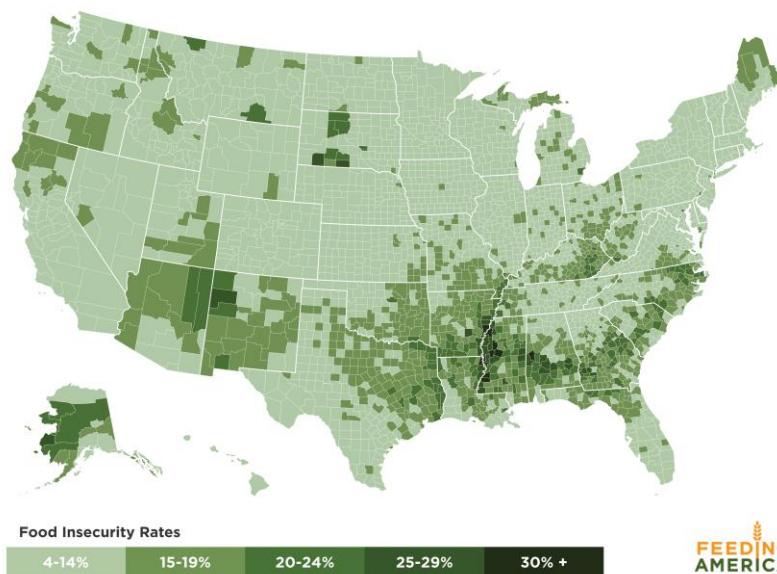
As expected, after controlling for other factors, higher unemployment and poverty rates are associated with higher rates of food insecurity. A one percentage-point increase in the unemployment rate leads to a 0.52 percentage-point increase in the overall food-insecurity rate, while a one percentage-point increase in poverty leads to a 0.25 percentage-point increase in food insecurity.

An interactive map that illustrates data from *Map the Meal Gap* can be found online at map.feedingamerica.org.

WHAT ABOUT UNDEREMPLOYMENT?

Underemployment occurs when a person is in the labor force, but is not obtaining sufficient hours or wages to make a living. This includes people who work less than full-time but would be working full-time if possible, and people who are in jobs not commensurate with their training or financial needs. Although unemployment continues to be associated with food insecurity, underemployment is another important condition that can lead to a strained household food budget. Currently, uniform BLS data on underemployment are not available at the county level; as a result, underemployment cannot be included in the *Map the Meal Gap* model estimating county-level food insecurity.

CHILD FOOD INSECURITY ESTIMATES

Children are particularly vulnerable to the economic challenges facing families today. Although food insecurity is harmful to any individual, it can be especially devastating to children, due to their critical stage of development and the potential for long-term consequences. Feeding America has replicated the food-insecurity model used for the general population to reflect the need among children.

Food Insecurity Rates: 4-14% | 15-19% | 20-24% | 25-29% | 30 +
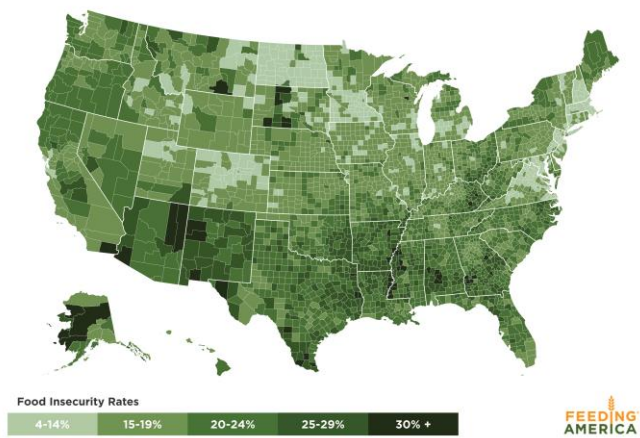
Similar to the calculations used to derive food-insecurity estimates for the overall population, CPS data are used to assess the relationship between state-level child food insecurity and associated variables (e.g. unemployment rates, child poverty rates, homeownership rates for families with children, etc.) that are publicly available at the county, congressional district, and state levels through the CPS, BLS and ACS.

Child food-insecurity estimates are sorted by the income categories used to identify eligibility for federal child nutrition programs (above and below 185% of the poverty line) such as the National School Lunch Program (NSLP), the School Breakfast Program (SBP) and the Special Supplemental Nutrition Program for Women, Infants and Children (WIC) in order to estimate how many food-insecure children are eligible and ineligible for federal child nutrition programs.

WHAT ABOUT SENIOR FOOD INSECURITY?

Nationally, we know that 7.7% of seniors (age 60 and older) are food insecure, with rates as high as 14.1% in Louisiana (Ziliak & Gundersen, 2018). We also know that the aging population has unique socioeconomic circumstances that may increase their need for food assistance and the need among community partners for local-level senior food-insecurity estimates. The *Map the Meal Gap* model, however, cannot currently produce local estimates of food insecurity among seniors. This is because key variables such as unemployment and homeownership are not as applicable to this demographic. And the sample size of seniors at the county level is often too small to allow for estimates as reliable as those for children and the general population.

FOOD PRICE VARIATION

In order to compare food prices across the country, a relative price index was developed by Nielsen, on behalf of Feeding America.[1] Nielsen analyzed nationwide sales data from Universal Product Code (UPC)-coded food items and assigned each UPC-coded food item to one of the 26 food categories in the USDA's Thrifty Food Plan (TFP).[2] These categories, representing major food groups, were weighted within the TFP market basket based on pounds purchased per week by age and gender. The market basket total was then translated into a county-specific multiplier (normalized to a mean value of 1) so that food prices can be compared across geographies. This multiplier can be applied to any dollar amount to estimate the relative local price of the item in question.

FOOD BUDGET SHORTFALL AND NATIONAL AVERAGE MEAL COST

The CPS asks respondents how much additional money they would need to buy enough food for their household (this follows questions regarding weekly food expenditures but precedes food-insecurity questions). On average, in 2017, food-insecure individuals reported needing an additional $16.99 per person per week, a decrease of less than 2% from $17.26[3] in 2016. This amount is the average weekly food budget shortfall that food-insecure people experience.

To arrive at an annualized food budget shortfall experienced by all food-insecure people, this value is first multiplied by the number of food-insecure persons. Because USDA analyses of CPS data reveal that food-insecure households are not food insecure every day of the year, but typically experience food insecurity for about seven months per year, 7/12 is used as a multiplier to arrive at the total estimated annual food budget shortfall across all food-insecure individuals. (Coleman-Jensen et al., 2018a).

| FOOD INSECURE PERSONS | $16.99 WEEKLY FOOD BUDGET SHORTFALL (CPS) | COST-OF-FOOD INDEX VALUE | 52 WEEKS PER YEAR | 7 of 12 MONTHS (USDA) |

In recognition that food costs are not the same across the nation, the average

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[1] In cases of counties with populations smaller than 20,000, Nielsen imputed a price based on data collected from all surrounding counties.
[2] The USDA TFP market basket is used to understand the relative differences in major food categories in a standardized way. It is not intended to evaluate the appropriate mix of food that people might purchase.
[3] In 2017 inflation-adjusted dollars. The nominal weekly food budget shortfall per food-insecure person in 2016 was $16.90, the equivalent of $17.26 in 2017 dollars.

food budget shortfall was also adjusted using the county multiplier from the local cost-of-food index, with 1 representing the national cost-of-food index.

To help equate the dollar amount of the food budget shortfall to meals, it is translated into an estimated meal shortfall, or "meal gap," using an average meal cost. The national cost-per-meal was derived from CPS data about how much the respondent's household spends on food in a week. We only include food costs reported by food-secure households to ensure that the result reflects the cost of an adequate diet. According to CPS data, we find that food-secure individuals spend an average of $63.42 per week, which, when divided by 21 (based on the assumption of three meals per day, seven days per week), amounts to an average meal cost of $3.02.

$63.42 SPENT ON FOOD PER WEEK (CPS) ÷ (3 MEALS PER DAY × 7 DAYS A WEEK)

As with the food budget shortfall, the average meal cost of $3.02 is adjusted to reflect differences in food prices across counties by using the aforementioned cost-of-food index. This local cost of a meal can then be used to translate the local food budget shortfall into an estimated number of additional meals needed. Estimates of meal costs and meal gaps are not intended to be definitive measures; however, the concept of a "meal" provides communities with a context for the scope of need.

Although food prices are one of many cost pressures that people face in meeting their basic needs (housing, utilities and medical expenses are other critical components), the ability to reflect differences in food costs across the country provides insight into the scope of the problems facing people who are food insecure and struggling to make ends meet.

OVERALL FOOD INSECURITY: RESULTS AND DISCUSSION

Map the Meal Gap estimates the number of food-insecure individuals and children in every county and congressional district in the United States. The study also estimates the share of the food-insecure population who likely qualify for federal nutrition assistance programs, like SNAP.

TRENDS IN COUNTY FOOD INSECURITY

This section reviews findings from the ninth year that Feeding America has conducted *Map the Meal Gap*. To identify any notable shifts, food-insecurity estimates for 2017 (the focus of this year's study) are compared to those in each of the prior four years.

Nationally, the food-insecurity rate decreased significantly from 12.9% in 2016 to 12.5% in 2017 (Coleman-Jensen et al., 2018).[4] At the county level, the average unweighted food-insecurity rate in 2017 remained roughly the same (13.3% versus 13.7% in 2016), with rates ranging from a high of nearly 36% in Jefferson County, Mississippi to a low of 3% in Steele County, North Dakota.

TABLE 01: AVERAGE ECONOMIC INDICATORS BY COUNTY TYPE[5]										
County Type	Food Insecurity		Unemployment		Poverty		Homeownership		Median Income	
	2016	2017	2016	2017	2016	2017	2016	2017	2016	2017
High Food Insecurity Counties	22.4%	21.4%	7.3%	6.5%	27.5%	27.2%	65.6%	65.1%	$34,756	$35,213
All Counties	13.7%	13.3%	5.3%	4.6%	16.4%	16.0%	71.2%	71.3%	$48,995	$49,754
All Individuals	12.9%	12.5%	4.9%	4.4%	14.0%	13.4%	63.1%	63.9%	$58,844	$60,336

Just over one percent (N=35) of all 3,142 counties in the U.S. experienced a statistically significant change between 2016 and 2017, with most (91%) experiencing a decrease. When 2017 estimates are compared to those from prior years, however, there are more counties with a statistically significant difference in their food-insecurity rate. Rates are significantly different for 10% (N=329) of all counties since 2015, 25% (N=799) since 2014, and 42% (N=1,314) since 2013.

Unemployment and poverty – two of the key indicators of food insecurity – also decreased in 2017 (see Table 01). The unweighted average unemployment rate across all counties decreased from 5.3% in 2016 to 4.6% in

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[4] The food-security module asks individuals about the prior 12 months, although it is plausible that individuals' responses may be most affected by their recent experience.

[5] County-level averages are unweighted. Individual-level estimates of food insecurity from the U.S. Department of Agriculture; unemployment from the U.S. Bureau of Labor Statistics; poverty and homeownership (American Community Survey) and median income (Fontenot et al., 2018). from the U.S. Census Bureau.

2017, while the average poverty rate also fell from 16.4% to 16.0%. Homeownership increased slightly (from 71.2% to 71.3%), and median income continued to rise even after accounting for inflation (from $48,995 to $49,754). [6] Despite these improvements, however, notable differences remain when comparing all counties to those with the highest rates of food insecurity across all economic indicators, suggesting persistent challenges facing communities with relatively high need.

The following sections explore current (2017) county-level findings in greater detail. Any statistically significant differences are noted.

COUNTIES WITH THE HIGHEST RATES OF FOOD INSECURITY

Of the 3,142 counties in the United States, we looked at the top 10% (N=317) whose food-insecurity rates are the highest in the nation.[7] Although the average food-insecurity rate across U.S. counties remains at roughly 13%, the average rate for these 317 "high food-insecurity rate" counties is 21%. In other words, within these highest risk counties, more than 1 in 5 residents struggle with hunger.

GEOGRAPHY

To better understand geographical variation across these counties, we analyzed them using the U.S. Office of Management and Budget (OMB) categories of metropolitan (metro) and micropolitan (micro) areas. We also considered less populous and more remote counties associated with neither metro nor micro areas. Most counties, whether metro or nonmetro, micro or other, contain a combination of urban and rural populations. For the purposes of this study, we define "rural" counties as those that fall within the broader category of nonmetro counties. In other words, rural (nonmetro) counties are located outside the boundaries of more populous metro areas and may be part of smaller micro areas or even less populated and more remote geographic areas.

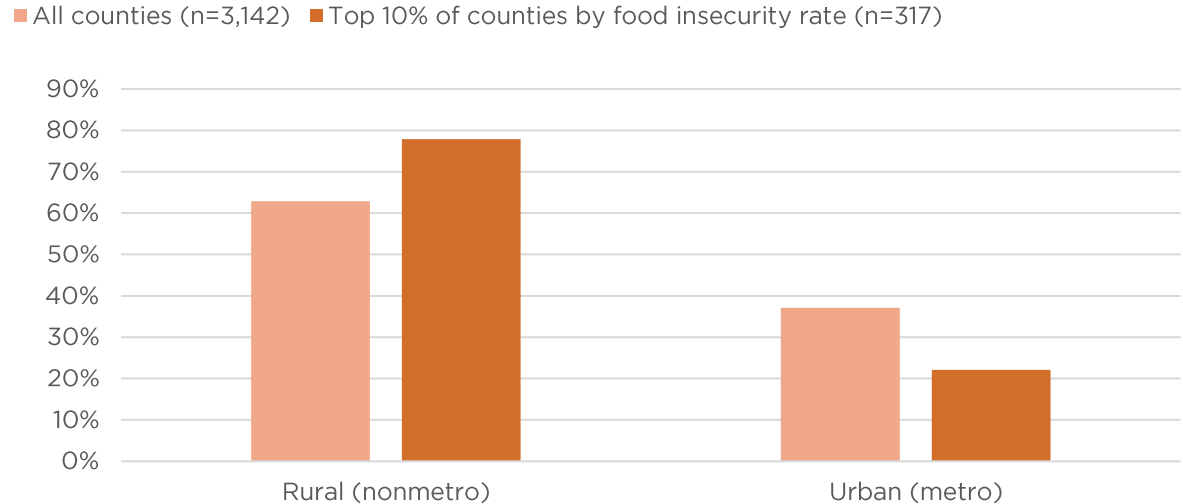| TABLE 02: HIGH FOOD-INSECURITY RATE COUNTIES BY GEOGRAPHIC AREAS, 2017		
County Type	High Food-Insecurity Rate Counties	All Counties
Metropolitan (urban)	22.1%	37.1%
Micropolitan (rural)	23.3%	20.4%
Neither (rural)	54.6%	42.5%
Total	100%	100%

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[6] Median income data for 2016 have been adjusted for inflation to 2017 values.
[7] All 3,142 counties defined by the U.S. Census Bureau were included in the analysis of 2017 data.

Consistent with 2016 findings, high food-insecurity counties are more likely to be rural compared to the average U.S. county (see Table 02). While rural counties make up 63% of all counties, they represent 78% of counties with the highest estimated rates of food insecurity in the country.

Counties with the Highest Food Insecurity are Disproportionately Rural
Share of counties by food insecurity and labor-market area, 2017

■ All counties (n=3,142)   ■ Top 10% of counties by food insecurity rate (n=317)

Note: "Rural" counties are those outside of metropolitan (metro) areas as defined by the Office of Management and Budget (OMB); they include counties that are either micropolitan (micro) or neither metro nor micro.

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High food-insecurity rate counties are located in eight of the nine U.S. Census Bureau geographic divisions (see Table 03).[8] The South, which encompasses the South Atlantic, East South Central, and West South Central divisions, contains 87% of the high food-insecurity rate counties. Although New England is not represented among the distribution of high food-insecurity rate counties, this geographic area includes some of the most populous counties in the U.S. and thus some of the largest numbers of food-insecure individuals.

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[8] U.S. Census Bureau Geographic Divisions: South Atlantic (DE, DC, FL, GA, MD, NC, SC, VA and WV), East South Central (AL, KY, MS and TN), West South Central (AR, LA, OK and TX), Mountain (AZ, CO ID, MT, NV, NM, UT and WY), West North Central (IA, KS, MN, MO, NE, ND and SD), Pacific (AK, CA, HI, OR and WA), East North Central (IL, IN, MI, OH and WI), Middle Atlantic (NJ, NY and PA), and New England (CT, ME, MA, NH, RI and VT).

TABLE 03: HIGH FOOD INSECURITY COUNTIES BY U.S. CENSUS DIVISIONS, 2017		
U.S. Census Division (Region)	Counties (#)	Counties (%)
South Atlantic (South)	99	31%
East South Central (South)	91	29%
West South Central (South)	87	27%
West North Central (Midwest)	15	5%
Mountain (West)	14	4%
Pacific (West)	6	2%
East North Central (Midwest)	4	1%
Middle Atlantic (Northeast)	1	0%
New England (Northeast)	0	0%
Total	317	100%

UNEMPLOYMENT, POVERTY, MEDIAN INCOME AND HOMEOWNERSHIP

By definition, high food-insecurity rate counties are more economically disadvantaged than the average U.S. county and the U.S. population as a whole, as seen in Table 01. The average annual unemployment rate among high food-insecurity counties was more than 7%, compared to 5% across all counties, with the county-equivalent Kusilvak Census Area, Alaska having the highest unemployment rate at 20%. The average poverty rate across these counties was also high, averaging 27% compared to 16% for all counties, and as high as 52% in Todd County, South Dakota. Not surprisingly, the average median household income in this group was lower than the national average: $35,067 versus $49,754 for all counties. The lowest median income in the group was $19,264 in McCreary County, Kentucky, less than half of the average of all counties. Homeownership rates were also lower in these counties at an average of 65% compared to 71% for all counties.

PERSISTENT-POVERTY COUNTIES

The USDA Economic Research Service (ERS) developed the term persistent poverty to track counties with consistently high percentages of people living below the poverty line. A county is considered a persistent-poverty county if at least 20% of its population has been living in poverty over the last 30 years (USDA ERS, 2017). Based on the most recent USDA data, there are 353 of these counties, 85% of which are rural. There is notable overlap between these counties and those that fall into the top 10% for food insecurity; nearly two-thirds (66%) of the "high food-insecurity rate" counties are also persistent-poverty counties. This confluence of long-standing poverty and heightened food insecurity underscores that low-income people living in these areas have been facing a number of interrelated problems that require complex, long-term solutions.

Some racial and ethnic minority groups in the U.S., such as African Americans and American Indians, are disproportionately at risk for food insecurity (Coleman-Jensen, Rabbitt, Gregory, & Singh, 20187), especially in these counties that have consistently struggled with poverty. In addition to having higher-than-average food-insecurity rates, persistent-poverty counties include a disproportionate share of counties with majority non-white populations, highlighting the deep and pervasive nature of the systemic challenges faced by many minority communities.

Counties with Persistent Poverty are Mostly White, but have Disproportionately Large Minority Populations
Share of counties by persistent poverty and race/ethnicity, 2017

■ Counties with persistent poverty (n=353) ■ All counties (n=3,142)
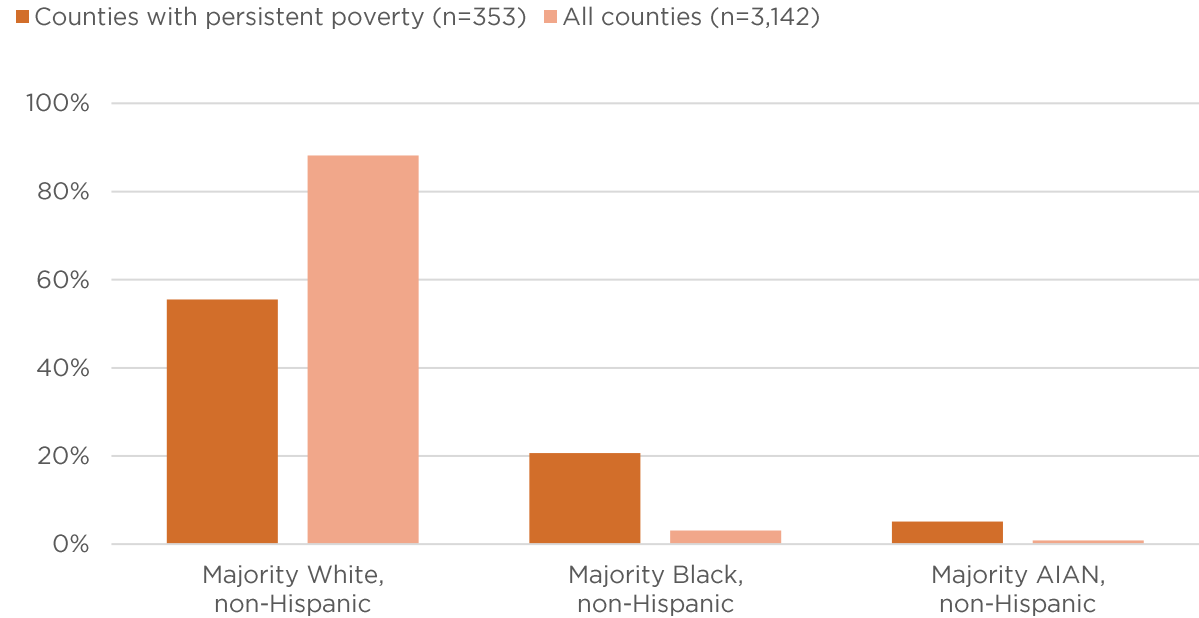
Source: Data from U.S. Census Bureau and USDA ERS, calculated by Feeding America

For example, while majority African-American counties form only 3% (N=97) of the 3,142 counties in the U.S., 92% (N=89) of them are high food-insecurity rate counties and 75% (N=73) are persistent-poverty counties.[9] With an average poverty rate of 29%, majority-African-American counties disproportionately experience poverty when compared to both high food-insecurity rate counties (27%) and the average county (16%). One such disadvantaged community is Jefferson County, Mississippi, where 86% of residents are African American. With a poverty rate of 47%, Jefferson County also has the highest food-insecurity rate in the U.S. at more than 36%.

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[9] This analysis was completed for all non-Hispanic African Americans.

Most Counties that are Majority Black or American Indian have Persistent Poverty
Share of counties by race/ethnicity and persistent poverty, 2017

■ Counties with persistent poverty ■ All other counties

Category	Counties with persistent poverty	All other counties
Majority Black, non-Hispanic (n=97)	75%	25%
Majority AIAN, non-Hispanic (n=26)	69%	31%
Majority White, non-Hispanic (n=2,770)	7%	93%
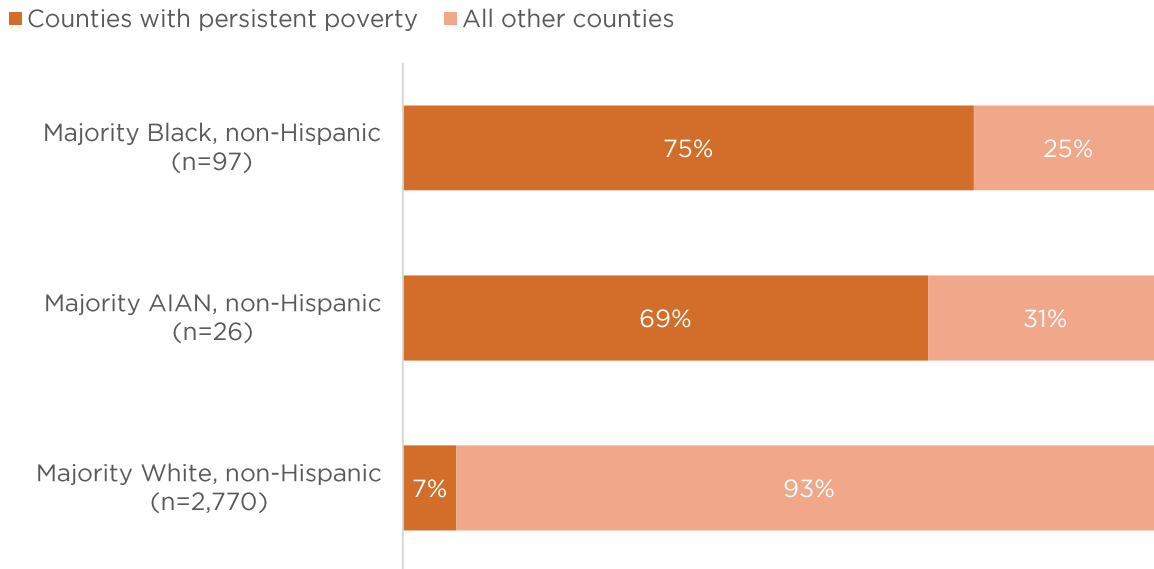
Source: Data from U.S. Census Bureau and USDA ERS, calculated by Feeding America
Note: Majority reflects 50% or more of the population

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Similarly, more than two-thirds (69%) of majority-Native American counties are persistent-poverty counties, with an average poverty rate of 33%. Even though majority-Native American counties represent less than 1% of all counties in the U.S. (N=26), most of them (69%) also fall into the high food-insecurity rate category.[10] Although a relatively small percentage of the total U.S. population identifies as Native American, county-level analysis helps bring to light the obstacles faced by reservation communities (Gordon & Oddo, 2012; Gundersen, 2008).

For example, Apache County, Arizona, which includes parts of the Navajo Nation, Zuni and Fort Apache reservations, is designated as a persistent-poverty county with a poverty rate more than double the national average (36% versus 16%) and a food-insecurity rate of 24%.

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[10] This analysis was completed for all non-Hispanic Native Americans.

FURTHER EXPLORATION OF COUNTIES

The following section analyzes county food insecurity by other dimensions, including low prevalence, large numbers of people, as well as rurality and region.

LOW FOOD-INSECURITY RATES

Over half (N=28) of the 50 counties with the lowest food-insecurity rates are found in North Dakota. This is consistent with the state's low unemployment rate and below-average poverty rate. In these 28 North Dakota counties, the estimated number of food-insecure individuals ranges from 40 to 1,910, and the food-insecurity rate ranges from 3% to 6%; nationally, the number of food-insecure individuals ranges from 10 to 1,135,710 and the food-insecurity rate ranges from to 3% to 36%.

Highlighting the critical difference between food-insecurity rates and number of food-insecure people, Suffolk County, New York is one of the 50 counties with the lowest food-insecurity rates, at just under 6%; however, there are still nearly 82,100 people who are food insecure in this county. It is important to note, as shown in Table 04, that in more populous areas, low food-insecurity rates do not necessarily translate into low numbers of food-insecure people.

HIGHEST NUMBERS OF FOOD-INSECURE INDIVIDUALS

While food-insecurity rates help illustrate the prevalence of need, populous counties with relatively low food-insecurity rates are home to some of the largest numbers of food-insecure people (see Table 04).

State	County (metro area)	Food Insecurity (#)	Food Insecurity (%)
NY	New York (five boroughs, collectively)	1,179,690	13.0%
CA	Los Angeles	1,135,710	11.2%
TX	Harris (Houston)	739,120	16.3%
IL	Cook (Chicago)	630,380	12.0%
AZ	Maricopa (Phoenix)	571,060	13.7%
TX	Dallas	438,830	17.2%
CA	San Diego	360,530	11.0%
MI	Wayne (Detroit)	344,440	19.5%
TX	Tarrant County (Fort Worth)	316,980	16.0%
PA	Philadelphia County	314,820	20.1%

TABLE 04: COUNTIES WITH THE HIGHEST NUMBER OF FOOD-INSECURE INDIVIDUALS, 2017

Among the 50 counties with the highest *number* of food-insecure people, the average food-insecurity rate is 14%, slightly exceeding the average across all counties. Although homeownership (55%) rates in these counties are lower than the average across all counties, their average poverty rate and average

unemployment rate are roughly equivalent to the national county average (16% for poverty and 4.4% versus 4.6% for unemployment).

While most of the 50 counties with the largest numbers of food-insecure people encompass the entirety of large cities, there are some exceptions. Oakland County, Michigan (135,440 food-insecure individuals) includes the suburbs northwest of Detroit, and DeKalb County, Georgia (131,820 food-insecure individuals) includes parts of Atlanta, but also suburbs to the east of the city, illustrating that the issue of hunger is not isolated to large metropolitan areas.

FOOD INSECURITY IN RURAL AMERICA

As discussed above, counties with the highest rates of food insecurity may be disproportionately rural and located in the South, but how does local food insecurity compare across all counties by region and rurality?

Across all rural (nonmetro) counties, the average food-insecurity rate (13.7%) is slightly higher than the average rate across all counties (13.3%) and higher still compared to urban (metro) counties (12.5%) (See Table 05). It is possible to further examine rural and urban county food insecurity by U.S. Census regions. For instance, rural counties in the South have some of the highest rates of food insecurity in the country while urban counties in the Northeast have some of the lowest. In fact, southern rural counties have the highest average food-insecurity rate in the country (16%) relative to regional averages from rural counties in the West (13%), followed by the Northeast (12%) and Midwest (12%).

TABLE 05: County Food-Insecurity Rates by Geographic Area, 2017					
County	National	South	West	Midwest	Northeast
Urban (metro)	12.5%	13.7%	12.0%	11.3%	10.5%
Rural (nonmetro)	13.7%	16.1%	13.0%	11.5%	11.6%
All counties	13.3%	15.1%	12.7%	11.4%	11.0%

County Food Insecurity Highest in the Rural South
Average county food insecurity rates by region and labor-market area, 2017

■ Urban (metro)   ■ Rural (nonmetro)

	South	West	Midwest	Northeast
Urban (metro)	13.7%	12.0%	11.3%	10.5%
Rural (nonmetro)	16.1%	13.0%	11.5%	11.6%
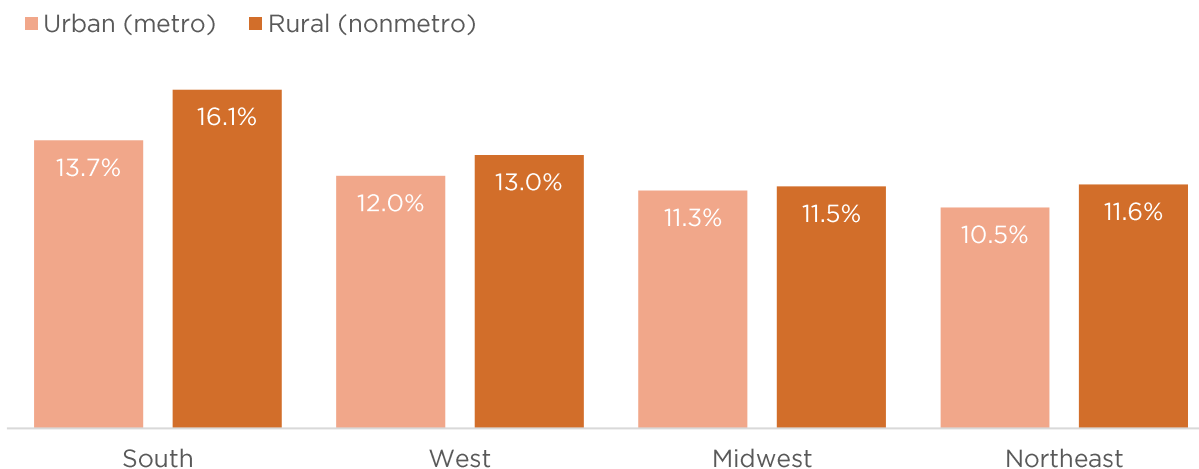
Source: Food insecurity data from *Map the Meal Gap 2019.*
Note: Averages are unweighted; rural counties are defined as those in nonmetropolitan areas per the Office of Management and Budget (OMB).

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In the South region, some of the most food-insecure counties are those with small towns far from big cities. One such county is Leflore County, Mississippi, which has a food-insecurity rate of 30% and contains the town of Greenwood, population of 15,000. The nearest city to Greenwood is Jackson, Mississippi, nearly 100 miles away. Conversely, urban counties in the Northeast have some of the lowest rates of food insecurity in the country. Among urban counties across Census regions, the lowest average county food-insecurity rates are in the Northeast (11%), followed by the Midwest (11%), West (12%), and South (14%).

The variation in county food-insecurity rates becomes even more apparent using the USDA classification scheme known as Rural-Urban Continuum Codes (RUCCs). Using this classification, urban (metro) counties are subdivided into three categories based on the population size of their metro area and nonmetro counties are subdivided into six categories based on their degree of urbanization and adjacency to a metro area. Using these definitions, rural counties in the South with populations of 20,000 or more that are not adjacent to a major metro area have relatively high rates of food insecurity (17% on average). Conversely, urban counties in the Northeast with populations of 1 million or more tend to have much lower rates of food insecurity (10% on average).

Analyzing food insecurity by geography highlights that individuals' need for food may vary across rural and urban communities, as well as by national region. As practitioners and policymakers seek to address food insecurity across the United States, they should strive to include areas that are more difficult to reach, and where communities may have insufficient infrastructure and resources needed to help meet the needs of their food-insecure neighbors.

FOOD INSECURITY AND INCOME

Estimating food-insecurity rates by level of income can provide important insight into the potential strategies that can be used to address hunger.

Federal nutrition programs like SNAP use various income thresholds to determine a family or individual's eligibility for that program. These income thresholds are tied to multiples (e.g., 100%, 135%, 185%) of the federal poverty line. The poverty guidelines, which vary by household size, reflect a minimum amount of money that a family needs to purchase basic necessities.

WHAT IS THE FEDERAL POVERTY LINE?

The poverty thresholds were established in 1963 based on research that indicated the average family spent about one-third of its annual income on food. The official poverty level was set by multiplying food costs by three for a "bare bones" subsistence meal plan (Blank & Greenberg, 2008). Although the figures are updated annually to account for inflation, they have otherwise remained unchanged, despite the fact that modern family budgets are divided very differently than they were more than 50 years ago (Blank & Greenberg, 2008). Now, household budgets include myriad expenses that have increased relative to food prices or were virtually non-existent when the official poverty measure was created.

SNAP AND OTHER FEDERAL NUTRITION PROGRAMS

Federal food assistance programs such as the Supplemental Nutrition Assistance Program (SNAP), the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC) and school meals, including the School Breakfast Program (SBP) and the National School Lunch Program (NSLP) determine eligibility thresholds by multiplying the official poverty line by 130% or 185% to provide a rough proxy for need beyond the scope of the official poverty level (see Table 06). SNAP eligibility thresholds are state-specific and range from 130% to 200% of poverty, while WIC and reduced-price school meals are typically only available to children in households with incomes below 185% of poverty.

For example, the poverty guideline for a family of four in the lower 48 states is a pre-tax income of $25,750 (HHS, 2019). To determine the federal income limit for SNAP eligibility, one would multiply $25,750 by 130% to arrive at $33,475. This means that, among other eligibility criteria, in many states, a family of four earning more than $33,500 is unlikely to qualify for SNAP.[11]

TABLE 06: Poverty Guidelines and SNAP Eligibility for the 48 Contiguous States and D.C.		
Household Size	Poverty Guideline (2019)	SNAP Income Limit
1	$12,490	$16,237
2	$16,910	$21,983
3	$21,330	$27,729
4	$25,750	$33,475

Source: U.S. Department of Health and Human Services, U.S. Department of Agriculture
Note: Gross income limits for SNAP vary by state, ranging from 130-200% of poverty

Because of the common use of these federal nutrition program thresholds, the *Map the Meal Gap* analysis estimates how many food-insecure people's incomes fall within each income bracket. For more information about the methodology of calculation the income bands among the food-insecure population, please reference the technical brief.

Areas with a high percentage of food-insecure individuals eligible for SNAP (based on gross income) might benefit from increased awareness, outreach and application assistance for enrollment in SNAP. Looking across income eligibility estimates provides context for determining what federal and state programs are available to food-insecure people and what gaps are left to be addressed by charitable food assistance like food banks. Understanding the overlap between food insecurity and federal nutrition program eligibility provides local agencies with the level of information needed to tailor programs to meet local need.

ELIGIBILITY FOR FEDERAL NUTRITION PROGRAMS

Federal nutrition programs are the first line of defense against hunger, but not everyone who is food insecure receives adequate support or even qualifies for federal assistance. Nearly three in 10 (29%) individuals in food-insecure homes with reported incomes earn too much to qualify for most federal nutrition assistance (Coleman-Jensen et al., 2018).

At the local level, we find that virtually every county (99%) is home to people who are food insecure and unlikely eligible for these programs. Given the variation in food insecurity and state income and asset limits for certain

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[11] The SNAP gross income eligibility level varies across states, ranging from 130 to 200 percent of the federal poverty level. The SNAP net income eligibility level must fall at or below 100 percent of the federal poverty level.

programs, the share of the population at risk of hunger and likely ineligible reaches as high as 80% in Daggett County, Utah.

Federal Nutrition Programs Don't Reach Everyone in Need
Percentage of food-insecure people by income eligibility guidelines for SNAP, WIC and Child Nutrition Programs, 2017

■ Below Low Threshold   ■ Between Thresholds   ■ At or Above High Threshold

National	51%	19%	29%
New Hampshire	48%		52%
California	75%		25%
Daggett County (UT)	13%	8%	80%
Bronx County (NY)	100%		

0%   20%   40%   60%   80%   100%
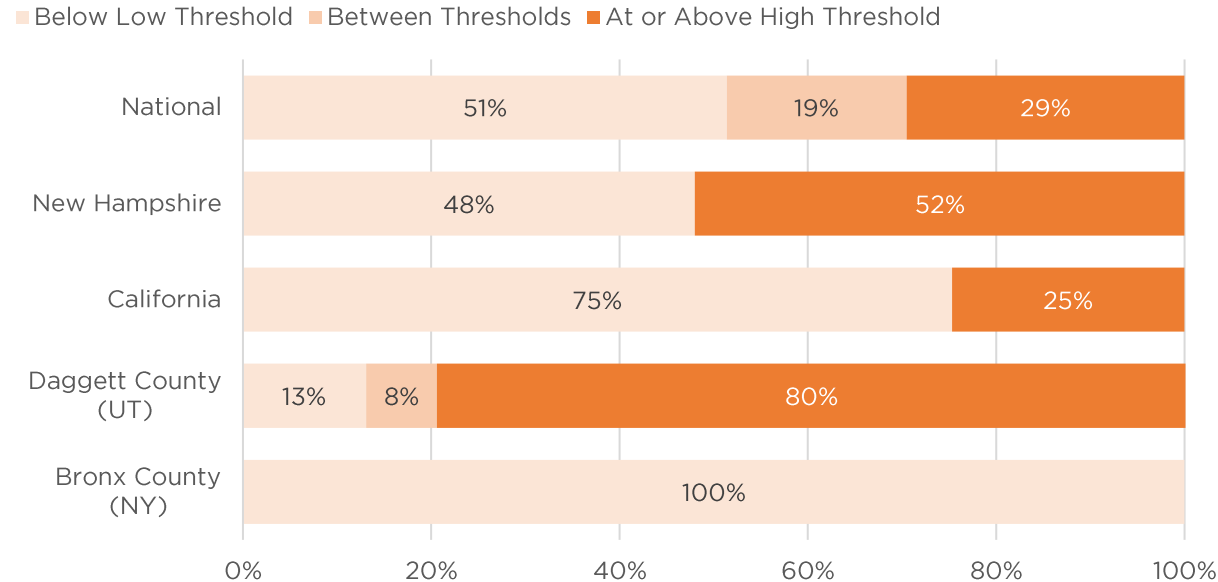
Source: National data from the *Statistical Supplement to Household Food Security in the United States in 2017* (USDA) and among food-insecure households whose incomes are known; state and county data from *Map the Meal Gap 2019* (Feeding America).
Notes: Gross income limits for federal nutrition programs vary by state; lower limits range from 130-200% of the federal poverty level (FPL) and upper limits range from 185-200% FPL. Totals may range from 99-101% due to rounding.

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In every state except New Hampshire, and in most counties, a majority (50% or more) of people estimated to be food insecure are likely to qualify for some form of federal nutrition assistance. Many states, however, contain a mix of counties wherein some contain a majority food-insecure population that are eligible for SNAP while others have a majority food-insecure population that is likely ineligible for any form of federal food assistance. In fact, there are 132 counties in which a majority of food-insecure people are unlikely to qualify for any government food assistance programs.

Among counties with the highest rates of food insecurity (those in the top 10%), it is less common for people to be food insecure and ineligible for government food assistance. Whereas across all counties, on average 30% of people estimated to be food insecure earn more than the state gross income limit, among counties with the highest food-insecurity rates, on average 22% of food-insecure individuals are unlikely to qualify. What these findings suggest, however, is that even in high food-insecurity counties there are

individuals in need who may fall outside the federal safety net and have nowhere else to turn but to the charitable food assistance network.

FOOD INSECURITY, HEALTH INSURANCE, AND HOUSING

Some households that are struggling to make ends meet may not have room in their budget for health insurance. Insurance helps pay for medical expenses, such as doctor visits and medications. For a household without health insurance, the cost of these expenses can take families from just above the poverty line to below it. However, a food-insecure household may not be able to afford health insurance, or the copays that come with it. Data from *Map the Meal Gap* indicate that counties with the highest rates of food insecurity also tend to have higher uninsured rates (15%) relative to all counties (11%).

Health and Housing in Counties with High Food Insecurity
Percentage of total county population by health insurance coverage, rental burden and food insecurity, 2017

■ Counties with high food insecurity   ■ All counties
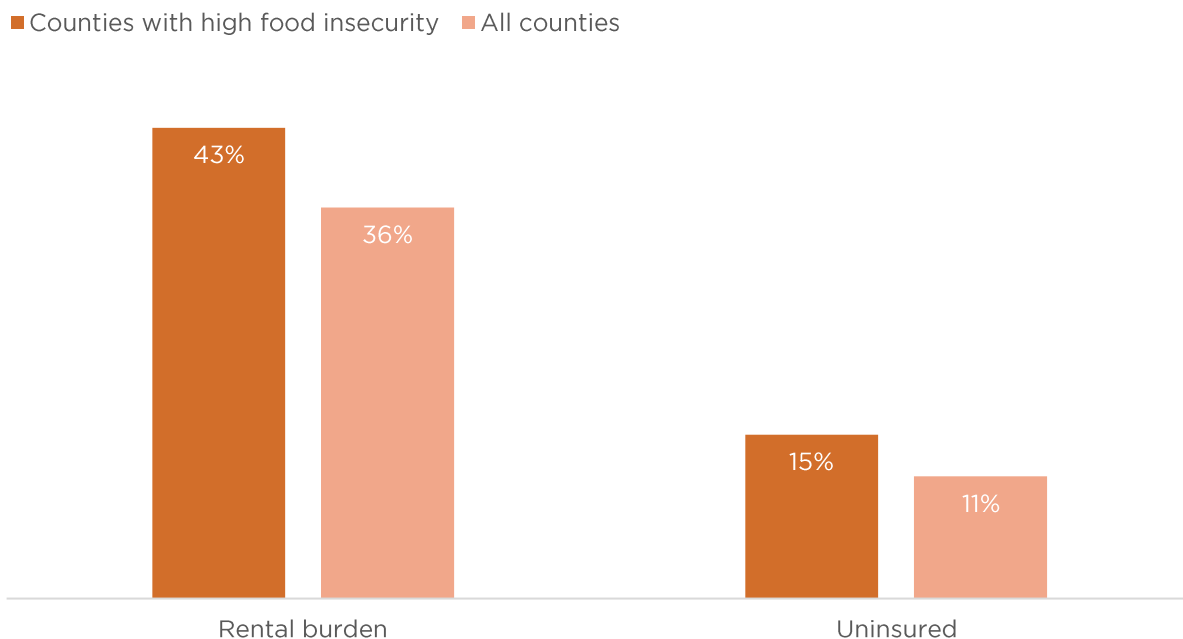
Source: Food insecurity data from Feeding America; other data from Centers for Disease Control and the American Community Survey.
Note: Counties with high food insecurity refer to the top 10% (n=317) of all 3,142 U.S. counties and county equivalents with the highest estimated rates of food insecurity.

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Research also suggests a relationship between housing instability and poor health outcomes in a household. For example, bouts of homelessness can have a profoundly negative impact on a family's mental and emotional stress, and unstable housing increases the likelihood that a family will not be able to comply with a prescription or treatment for a chronic illness (Kushel, Gupta, Gee, & Haas, 2006; Hwang, 2001). High rental burden, which occurs when a household pays 35% or more of their income on rent, may also indicate a lack of resources for a household to afford adequate food and health insurance coverage, potentially increasing the risk for negative health outcomes. Compared to all counties, those with higher rates of food insecurity tend to have higher rates of rental burden (43% versus 36%).

FOOD INSECURITY IN CONGRESSIONAL DISTRICTS

In addition to county-level food-insecurity estimates, Feeding America generates estimates for congressional districts using the same methodology (refer to the Methodology Overview section above). As is the case with counties, no congressional district is free of food insecurity. Prevalence ranges from a low of 4% in Virginia's 10th congressional district to a high of 27% in Michigan 13th.

Congressional districts that fall within the top 10% for high food-insecurity rates (44 districts) had an average (unweighted) food-insecurity rate of 21% compared to 13% across all districts. Much like the high food-insecurity rate counties, high food-insecurity rate congressional districts are heavily concentrated in the South (see Table 07).

TABLE 07: HIGH FOOD-INSECURITY RATE DISTRICTS BY CENSUS DIVISION, 2017		
U.S. Census Division (Region)	Districts (#)	Districts (%)
South Atlantic (South)	11	25.0%
East North Central (Midwest)	10	22.7%
West South Central (South)	10	22.7%
East South Central (South)	6	13.6%
Middle Atlantic (Northeast)	6	13.6%
West North Central (Midwest)	1	2.3%
Total	44	100.0%

When compared to national averages, the districts with the highest food-insecurity rates also had higher-than-average unemployment (8% versus 5%) poverty (21% versus 13%), and lower-than-average median income ($44,797 versus $62,528). The wealthiest districts, representing the 10% with the highest median incomes, are also not immune to the issue of hunger. These affluent communities are home to an average of 66,000 people estimated to be food insecure. Cumulatively, the wealthiest congressional districts are home to 2.9 million food-insecure men, women and children.

FOOD PRICE VARIATION ACROSS THE UNITED STATES

The first phase of the *Map the Meal Gap* analysis focused on increasing understanding of the population in need by estimating county and congressional district level food-insecurity rates. In conjunction, Feeding America sought to understand how much additional food those who are struggling with food insecurity feel they need and how the relative cost of meeting that need may vary due to food prices at the local level.

To address this goal, a local-level estimation of the additional food budget that food-insecure individuals report needing was developed. In order to understand how regional and local variations in food costs may present challenges for the food-insecure population, Feeding America worked with Nielsen to create a county-level food cost index. Although this analysis does not imply causality between food costs and food insecurity, other research indicates that food costs can directly impact food insecurity (Nord et al., 2014). Food prices represent an important component of cost-of-living that affects households' ability to afford food.

As of 2017, the average meal cost (the average amount that a food secure individual reports spending) in the United States is $3.02, a slight decline (when adjusting for inflation) from $3.06 (in 2017 dollars) in 2016 ($3.00 in 2016 dollars).[12] Local meal costs range from 68% to more than twice the national average, resulting in meal cost variations ranging from as little as $2.07 in Willacy County, Texas to as much as $6.20 in Crook County, Oregon.[13] Counties with the highest estimated meal costs are disproportionately urban and less likely to be rural relative to all counties (see Table 08).

Across all counties where the average meal cost is higher than the national average, there are an estimated 24.1 million food-insecure people. Among counties in the continental United States that have the highest food-insecurity rates, meal costs reach as high as 124% of the national average ($3.74 per meal in Lafayette County, Mississippi). For a household struggling to afford housing, utilities, transportation and other basic necessities, the additional burden of high food prices can have a significant impact on a household's budget.

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[12] Between 2016 & 2017, the inflation rate was 2.1%
[13] The calculations for variance of food price and the highest meal cost among high food-insecure counties exclude Alaska and Hawaii; the total number of food-insecure people in counties with food costs higher than the national average includes all 50 states.

TABLE 08: HIGH-COST COUNTIES BY GEOGRAPHIC AREA, 2017		
County Type	High-Cost Counties	All Counties
Metropolitan (urban)	58%	37%
Micropolitan (rural)	17%	20%
Neither (rural)	25%	42%
Total	100%	100%

COUNTIES WITH HIGHER FOOD PRICES

The top 10% of counties with the highest meal costs (N=322) have an average meal cost of $3.63, 20% higher than the national average of $3.02. There are 69 counties where the cost of a meal is at least 25% higher than the national average ($3.78 or higher). Among the 10% of counties with highest meal costs, more than half (58%) are located in urban (metro) areas (versus 37% of all counties), while 42% are in rural (nonmetro) areas (versus 63% of all counties).

As noted above, a larger share of counites with the highest meal costs are part of populous urban areas. Food prices tend to be higher in urban counties overall, but meal costs vary substantially by rural county and region. For example, some of the highest meal costs in the country are in rural counties that are adjacent to a major metro area. In one of these counties, Nevada County, California, the cost per meal is $4.62, 53% higher than the national average; however, the largest municipality in Nevada County is Grass Valley, population 13,000, which is 60 miles from Sacramento, California. Other counties that rank among those with the highest meal costs are in the Northeast and are part of more urban areas; one example is Manhattan (New York County), where the meal cost is $5.85, making it the county with the third highest meal cost in the United States.

In some cases, the meal cost may be high in part due to the expense of transporting food to a resort area or an island. For example, Nantucket County, Massachusetts, where the average cost of a meal is $3.70, is a popular island vacation destination with a high median income. Other counties with a significant resort or vacation presence are among the highest meal-cost areas, such as Aspen in Pitkin County, Colorado ($3.61) and Napa County, California ($4.19). While local families in such areas typically have higher-than-average median incomes, these communities are also home to households with lower incomes for whom higher food costs can be particularly challenging.

HIGH FOOD INSECURITY COUPLED WITH HIGH FOOD COST

Seven counties fall into the top 10% for both food insecurity and meal cost (see Table 09). An average of one in every five individuals in these counties is food insecure, totaling more than 181,000 food-insecure people who live in

areas with some of the highest meal costs. Although these counties may not face the highest food prices in the nation, the average cost per meal reaches as high as $3.74 in Lafayette County, Mississippi, 24% higher than the national average. Six of the seven counties are located in the South, and four have persistent poverty. Although these counties have an average unemployment rate (4.8%) close to the national county average (4.6%), they have higher-than-average poverty (25% versus 16%) and lower-than-average homeownership (52% versus 71%).

TABLE 09: COUNTIES WITH HIGHEST FOOD INSECURITY AND MEAL COSTS, 2017								
County	State	Region	Food Insecure	Meal Cost	Unemployment	Poverty	Homeownership	Median Income
Pike	AL	South	21.0%	$3.36	4.9%	26.3%*	59.2%	$35,684
Leon	FL	South	19.7%	$3.36	3.9%	20.5%	52.6%	$49,941
Orleans	LA	South	21.8%	$3.64	5.1%	25.4%*	47.1%	$38,721
Lafayette	MS	South	18.4%	$3.74	4.2%	25.3%*	58.4%	$45,019
Oktibbeha	MS	South	22.1%	$3.39	4.8%	29.8%*	53.2%	$37,348
Hopewell	WA	South	18.5%	$3.35	6.1%	21.2%	51.0%	$40,712
Whitman	WA	West	18.3%	$3.58	4.4%	27.5%	44.5%	$41,574

* Persistent-poverty county

High meal costs can force food-insecure households to make tradeoffs that in turn make it difficult to invest in their long-term economic success. They may even force families to choose between buying food and paying for housing. Compared to all counties, those with the highest meal costs tend to have lower rates of homeownership, higher rent, and a higher rental burden—which occurs when a household pays 35% or more of their income on rent (see Figure 06).

Figure 06: Counties with High Meal Costs have Slightly Lower Homeownership and Higher Rental Burden
Percentage of total county population by homeownership and rental burden among counties with high meal costs, 2017

■ Top 10% of Counties by Meal Cost ■ All Counties
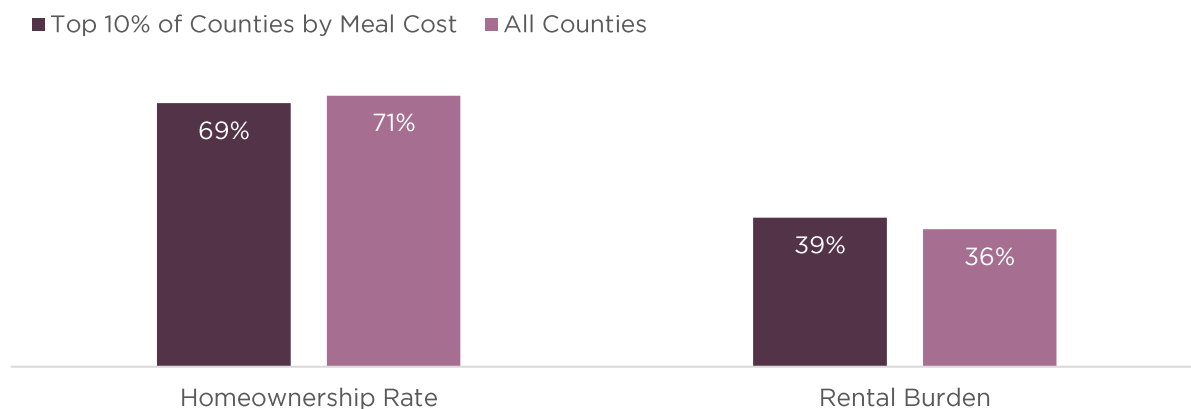
Source: Data from 2013-2017 American Community Survey (ACS).
Note: A household experiences rental burden when it pays 35% or more of its income on rent.
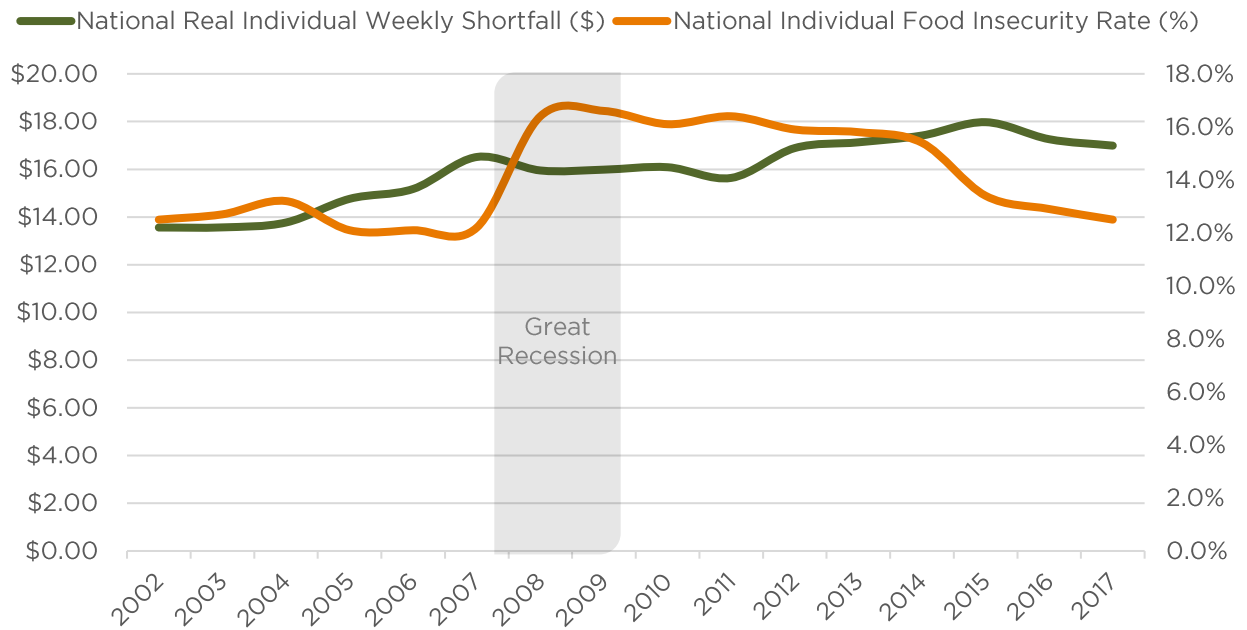
FOOD INSECURITY SINCE THE GREAT RECESSION

Across the United States, 40 million people (12.5%) are estimated to be food insecure as of 2017 (Coleman-Jensen et al., 2018). The prevalence of food insecurity has declined significantly since reaching 16.6% of the U.S. population in 2009, the last year of the Great Recession. The prevalence of food insecurity, however, only tells part of the story.

Food-insecurity rates alone do not provide insight into how the challenges facing food-insecure individuals have changed over time. One way to examine changing need among those struggling with hunger is to look at changes in how much additional money they report needing each week to meet their food needs, or the food budget shortfall.

In 2017, food-insecure households reported needing an additional $16.99 per person per week, on average, to meet their food needs. When accounting for inflation, this shortfall represents a 1.6% decrease from 2016; however, it also represents a 6.5% increase since 2008, the first full year of the Great Recession. Despite the national decline in food-insecurity rates, the amount of money food-insecure individuals report needing is still higher than it was at the start of the recession.

The increase in the food budget shortfall since 2008 helps shed some light on the continued struggles of food-insecure individuals and families across the country. Although the total number of people living in food-insecure households has decreased during the economic recovery, individual need among people who are food insecure has remained higher. Despite the economic recovery and reductions in unemployment and poverty, millions of people still struggle to get by because of persistent economic challenges, such as underemployment and stagnant wages. In addition, rising costs for essentials, especially rent and housing expenses, continue to put real cost pressure on low-income families, many of whom already report having to make regular spending tradeoffs to help ensure they have sufficient food.

Figure 05: Reported Need Down but Still High in 2017
Reported dollars needed per week to be food secure

— National Real Individual Weekly Shortfall ($)   — National Individual Food Insecurity Rate (%)

Great
Recession

Note: Shortfall values from *Map the Meal Gap 2019* calculated using Current Population Survey (CPS) data and adjusted for inflation using 2017 dollars; food-insecurity rates from the USDA

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CHILD FOOD INSECURITY: RESULTS AND DISCUSSION

Although in 2017 child food insecurity continued its downward trend since the recession, the results of *Map the Meal Gap* indicate that children remain at risk in every state, county and congressional district in the United States.

Although households with children have slightly higher median incomes on average, they may also experience greater budgetary constraints, due to larger household sizes and the fact that some household members rely on caregivers and do not contribute to household income (Coleman-Jensen et al., 2013). Across states, the percentage of children estimated to live in a food-insecure household is notably higher compared to the general population. This is consistent with what the USDA finds at the national level.

The following sections summarize key findings related to local child food insecurity, including a discussion on income and regional variations.

CHILD FOOD INSECURITY AT THE STATE LEVEL

Child food insecurity ranges from a low of 10% in North Dakota to a high of 24% in New Mexico (see Table 10). Even in the most food-secure state (North Dakota), 1 in 10 children is at risk of hunger.

Sixteen of the 20 states with the highest child food-insecurity rates also have the highest rates of food insecurity among the general population. Of these 16 states with the highest need among both populations, 12 (75%) are located in the South. Some states in the Northeast, despite having lower child food-insecurity rates, have high absolute numbers of children living in food-insecure households because they are densely populated. For example, New York (18%) is home to 732,300 food-insecure children.

TABLE 10: CHILD FOOD INSECURITY BY STATE, 2017			
State	Rank	Child Food Insecurity (%)	Child Food Insecurity (#)
U.S. (USDA)		17.0%	12,540,000
NM	1	24.1%	118,030
AR	2	23.6%	167,440
LA	3	23.0%	255,640
MS	4	22.9%	163,530
TX	5	22.5%	1,658,680
AL	6	22.3%	243,880
OK	7	22.2%	213,720
AZ	8	21.3%	348,550
DC	9	21.2%	26,450
WV	10	20.6%	76,970
FL	11	20.4%	854,880
NC	12	20.1%	461,630
GA	13	20.0%	503,370
NV	13	20.0%	136,800
OH	15	19.6%	510,030
OR	16	18.9%	165,290
TN	16	18.9%	285,770
AK	18	18.7%	34,690
ME	19	18.5%	47,020
KY	20	18.4%	186,660
KS	21	18.3%	130,210
SC	21	18.3%	202,110
CA	23	18.1%	1,638,430
NY	24	17.6%	732,300
HI	25	17.5%	53,540
MO	25	17.5%	243,110
IN	27	17.4%	273,380
NE	27	17.4%	82,370
WY	27	17.4%	23,960
RI	30	17.3%	35,760
WA	30	17.3%	284,760
DE	32	17.0%	34,750
PA	33	16.4%	437,340
SD	33	16.4%	34,970
MT	35	16.1%	36,910
MI	36	15.9%	345,130
VT	36	15.9%	18,760
ID	38	15.8%	69,920
IL	39	15.7%	453,260
CT	40	15.5%	115,240
WI	41	15.4%	197,290
IA	42	15.3%	111,520
MD	43	15.2%	204,660
UT	44	14.7%	135,940
CO	45	14.0%	177,360
NJ	46	13.2%	260,340
VA	46	13.2%	247,470
MN	48	12.6%	163,310
NH	49	12.3%	31,640
MA	50	11.7%	159,950
ND	51	9.8%	16,900

CHILD FOOD INSECURITY AT THE COUNTY LEVEL
CHILD FOOD INSECURITY CHANGE BETWEEN 2016 AND 2017

Nationally, the percent of children living in food-insecure households stands at 17% in 2017, roughly equivalent to the rate in 2016 (Coleman-Jensen et al., 2018). Consistent with this national trend, nearly 99% of all counties did not see statistically significant changes in their child food-insecurity rates between 2016 and 2017. Of the 33 counties that did, however, 29 (88%) saw decreases. It bears mentioning that county level estimates may be less stable from year to year than those at the state or national level due to smaller sample sizes, particularly in counties with very small child populations. Because of the likelihood for inaccurate estimates from smaller sample sizes, specific county comparisons between 2016 and 2017 are not provided in this report.

CHILD FOOD-INSECURITY RATES

The variation in rates of child food insecurity at the county level demonstrates that this issue is much more pervasive in specific communities, although no county is free of child food insecurity. The percent of children estimated to be food insecure at the county level ranges from a low of 6% to a high of 40%.[14] Across the 325 counties that fall into the top 10% for the highest child food-insecurity rates, however, the percent of children living in food-insecure households ranges from 25% to 40%. These counties also have notably higher poverty rates compared to the rest of the nation. Across the highest child food-insecurity counties, an average of 40% of children live in poverty, compared to 22% across all U.S. counties. These counties also suffer from low median incomes and high unemployment rates (see Table 11).

Table 11: AVERAGE CHILD FOOD INSECURITY AND ECONOMIC INDICATORS, 2017										
	Child Food Insecurity		Unemployment		Child Poverty		Homeownership*		Median Income*	
County Type	2016	2017	2016	2017	2016	2017	2016	2017	2016**	2017
High Child Food Insecurity	28.3%	27.5%	7.8%	6.7%	40.5%	40.0%	56.4%	56.7%	$36,993	$38,281
All U.S. Counties	20.1%	19.4%	5.3%	4.6%	22.8%	22.1%	64.8%	65.0%	$57,864	$58,997

*Among households with children
**In 2017 inflation-adjusted dollars

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[14] Results indicate that child food insecurity exists in every county in the U.S. with a population under age 18. The 2017 ACS dataset does not contain adequate data for Loving, TX and Kalawao, HI. As a result, child food-insecurity rates could not be estimated for these two counties

Similar to the overall population, there is considerable overlap between the counties with the highest rates of child food insecurity and the persistent-poverty counties identified by the USDA: more than half (N=180) of the high child food-insecurity rate counties (N=325) are also persistent poverty counties. In five of the top 10% of counites with the highest child food-insecurity rates, more than 35% of children live in food-insecure households, including East Carroll Parish, Louisiana with a rate of 40%. All five of these counties are designated as persistent-poverty counties by the USDA and are home to a majority non-white population, consistent with the overall findings that minority groups in some of these communities are disproportionately affected by longstanding poverty and systemic challenges. Three counties—Issaquena County, Mississippi, Kusilvak Census Area, Alaska, and East Carroll Parish, Louisiana—have higher child food-insecurity rates than even the highest rate of food insecurity among the general population (36% in Jefferson County, Mississippi). However, it is important to note that child food insecurity is more pervasive in rural areas. Rural (nonmetro) counties account for 84% of high child food-insecurity counties, but only 63% of all U.S. counties (see Table 12).

TABLE 12: HIGH CHILD FOOD-INSECURITY COUNTIES BY GEOGRAPHIC AREAS, 2017		
County Type	Top 10% Counties by Child Food Insecurity	All Counties
Metropolitan (urban)	16.0%	37.1%
Micropolitan (rural)	21.8%	20.4%
Neither (rural)	62.2%	42.5%
Total	100.0%	100.0%

COUNTIES WITH THE HIGHEST NUMBER OF FOOD-INSECURE CHILDREN

Although the rate of child food insecurity is one important indicator of need, even counties with modest rates may still be home to large numbers of children whose families are food insecure. There are 13 counties in the U.S. with more than 100,000 food-insecure children (see Table 13). For example, Los Angeles County, California is home to more than 410,000 food-insecure children. Cook County, Illinois and Harris County, Texas both fall into this group and contain the third and fourth most populous cities in the United States (Chicago and Houston, respectively). Across the five counties that comprise New York City, there are over 335,000 food-insecure children in total. Counties with more than 100,000 food-insecure children have an average child food-insecurity rate of 19%, an average child poverty rate of 23% and an average unemployment rate of 4%.

TABLE 12: COUNTIES WITH MORE THAN 100,000 FOOD-INSECURE CHILDREN, 2017			
State	County (Metro Area)	Food-Insecure Children (#)	Food-Insecure Children (%)
CA	Los Angeles	413,910	18.2%
NY	New York (five boroughs, collectively)	335,820	18.2%
TX	Harris (Houston)	284,790	23.2%
AZ	Maricopa (Phoenix)	210,760	20.4%
IL	Cook (Chicago)	184,900	15.8%
TX	Dallas	156,630	22.9%
CA	San Diego	120,360	16.5%
TX	Tarrant (Ft. Worth)	114,390	21.4%
CA	Orange (Anaheim)	112,480	15.7%
CA	Riverside	108,560	17.7%
FL	Miami-Dade	107,530	19.4%
CA	San Bernardino	107,180	18.7%
TX	Bexar (San Antonio)	103,360	21.0%

Although these counties may exhibit rates of child food insecurity close to the average of all counties, the fact that they are home to a large number of food-insecure children illustrates that they still face real challenges in addressing the need in their communities due to the sheer number of children whose families may be in need.

CHILD FOOD INSECURITY AMONG CONGRESSIONAL DISTRICT

Similar to findings at the county and state level, no congressional district is free of child food insecurity. Rates range from an estimated low of 9% (nearly 20,000 children) in Virginia's 10th congressional district to 30% (almost 63,000 children) in New York 15th congressional district. The congressional district with the largest number of food-insecure children is Texas' 15th, where an estimated 63,010 children (26%) live in food-insecure homes.

The congressional districts with the highest rates of child food insecurity – the 44 that fall into the top 10% among all districts – have an average rate of 25%, compared to 18% of children in the average district. Incomes in these districts are also much lower; the average child poverty rate across these districts is 32%, compared to 18% in the average district.

HEALTH IMPLICATIONS OF CHILD FOOD INSECURITY

There is a broad base of literature illustrating links between food insecurity and poor child health and behavioral outcomes at every age. For example, food-insecure women are more likely to experience birth complications than food-secure women (Laraia, Siega-Riz, & Gundersen, 2010). One indicator of

child and maternal health is low birthweight among infants, which is more common among counties with the highest rates of child food insecurity than across all counties (10% versus 8%) (Robert Wood Johnson Foundation, 2018). Furthermore, children struggling with food insecurity may be at greater risk for stunted development, anemia and asthma, oral health problems and hospitalization (Kirkpatrick, McIntyre, & Potestio, 2010; Eicher-Miller, Mason, Weaver, McCabe, & Boushey, 2009; Skalicky et al., 2006; Muirhead, Quiñonez, Figueiredo, & Locker, 2009; Cook, 2006). Overall, food insecurity is linked with poorer physical quality of life, which may prevent children from fully engaging in daily activities (Casey et al., 2005). At school, food-insecure children are at increased risk of falling behind their food-secure peers both academically and socially; food insecurity is linked to lower reading and mathematics test scores, and they may be more likely to exhibit behavioral problems, including hyperactivity, aggression and anxiety (Jyoti, Frongillo, & Jones, 2005; Slack, & Yoo, 2005; Whitaker, Phillips, & Orzol, 2006; Slopen, Fitzmaurice, Williams, & Gilman, 2010).

CHILD FOOD INSECURITY, INCOME, & FEDERAL FOOD ASSISTANCE

Nationally, WIC supports more than 7 million pregnant, breastfeeding and postpartum women and their young children (USDA FNS, 2019). The NSLP, SBP and Summer Food Service Program (SFSP) provide meals to low-income children in school and during school breaks. More than 100,000 schools operate NSLP, providing free or reduced-price lunches to 22 million children (USDA FNS, 2019). SNAP provides electronic benefit cards to households to purchase groceries, and although it is not limited to children, 44% of all SNAP participants in federal fiscal year 2017 were children (more than 18 million children) (USDA, 2019).

Federal nutrition programs are the first line of defense against hunger, and it is critically important to understand the income composition of the food-insecure population in each county and congressional district to help flag where outreach may be needed to maximize participation in these programs. In recognition of the importance of federal child nutrition programs to the development of low-income children, *Map the Meal Gap* provides estimates around whether children in food-insecure households are income-eligible for these programs.

Findings indicate that an overwhelming majority of food-insecure children in these counties are likely eligible to receive assistance from child nutrition programs. In 94% of U.S. counties (N=2,953), a majority (50% or more) of food-insecure children live in households with incomes at or below 185% of

the federal poverty line, meaning they are likely eligible for government programs targeted for children like WIC and school lunch. Among the high child food-insecurity counties, an average of 78% of food-insecure children live in households with incomes below 185% of the poverty line.

CHARITABLE FOOD ASSISTANCE

Although many food-insecure households are also low-income, households with incomes well above the federal poverty line can also be food insecure. In many counties, there are still food-insecure children whose households have incomes above 185% of poverty, which render them likely ineligible for any federal assistance targeted specifically to children.

In more than 200 counties, a majority of food-insecure children are likely ineligible for assistance. Examples of food-insecure children are found in diverse locations around the country. For example, in Daggett County, Utah, approximately 19% of all children are food insecure and 100% of these children live in households with incomes above 185% of the poverty line. In Nassau County, New York, more than half (57%) of the estimated 36,350 food-insecure children are living in households with incomes above 185% of the poverty level.

Some counties also have high child food-insecurity rates and low median incomes, but relatively high percentages of children living in ineligible households. In Clinch County, Georgia, for example, 27% of children are estimated to be food insecure and family median income is $21,838 (less than half the average of all counties). However, almost 1 in 4 food-insecure children (23%) are estimated to reside in households with incomes too high to qualify for government food programs. For these children and their families, charitable assistance may play a critical role in helping them meet their food needs.

As high levels of food insecurity persist, the number of families turning to charitable food assistance organizations remains at record levels. In 2013, more than 46 million people, representing nearly 15.5 million households, received assistance through the Feeding America network of food banks. Of the 46 million individuals reached by food banks, more than 12 million were children, 3.5 million of whom were ages 5 or younger. Nearly two-thirds (63%) of households served by Feeding America report planning to get food at meal or grocery programs on a regular basis to help with their monthly food budget, as opposed to waiting to come on an emergency basis (*Hunger in America*, 2014).

There may be a number of reasons why these households struggle. As discussed in the Methodology Overview, unemployment is a strong risk factor for food insecurity; however, other challenges, such as income shocks, medical expenses, living in a high-cost area and underemployment, may also contribute to these households' struggles to meet their food needs. In the Feeding America research report *In Short Supply: American Families Struggle to Secure Everyday Essentials*, low-income families reported altering their food purchasing habits in order to afford non-food necessities such as soap, personal hygiene products and diapers, highlighting that non-food needs can place equal burden on a struggling household (Santos et al., 2013).

Better understanding these nuances can enable state and local legislators, food banks and other community leaders to tailor efforts to best address the need within their own communities and understand where they can strengthen the safety net to ensure no child suffers. Children's vulnerability to recessions and other economic shifts depends on the strength of the social safety net.

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TECHNICAL BRIEF

The following methodological overview will provide a description of the methods and data used to establish the congressional district and county-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.

REASERCH 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 USDA food-insecurity measure.
- Does it reflect the many determinants of the need for food?
  - Yes, along with income, our measure uses information on unemployment rates, median incomes, and other factors that have been shown to be associated with food insecurity
- Can it be broken down by income categories?
  - Yes, we can break it down into relevant income categories
- 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 measures are all established by the Feeding America national office
- Can it be consistently applied to all counties in the U.S.?
  - Yes, the measure relies on publicly available data for all counties
- 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

SUMMARY OF METHODS

OVERALL AND CHILD FOOD-INSECURITY RATE

METHODOLOGY

We begin by analyzing the relationship between food insecurity and its determinants (poverty, unemployment, median income, etc.) at the state level. We then use the coefficient estimates from this analysis combined with information on the same variables defined at the county level to generate estimated food-insecurity rates for all individuals and for children at the county and congressional district levels.

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 and included unemployment rates, median income, poverty rates, homeownership rates, percent of the population that is African American, and percent of the population that is Hispanic. County and congressional district level data are drawn from the American Community Survey (ACS), with the exception of the 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, which is defined for the full population of the county.

FOOD BUDGET SHORFALL

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 $16.99. As discussed in *Household Food Security in the United States in 2017* (Coleman-Jensen et al., 2018), households experiencing food insecurity experience this condition in, on average, seven months of the year.

FI persons * $16.99 * 52 weeks * (7/12) =	$ reported needed by the food insecure to meet their food needs in 2017

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 a further question about how much more money is needed. 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, Nielsen 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) is not 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

Nielsen 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 x 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. Because congressional districts were redrawn in 2012, MMG estimates are available for the current congressional districts only for 2013 through 2017 (the last five years).

Step 1: Using state-level data from 2001-2017, we estimate a model where the food-insecurity rate for individuals at the state level is determined by the following equation:

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

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, 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). A complete list of questions in the CFSM is found in Table 1.

Our choice of variables was first guided by the literature on the determinants of food insecurity. We included variables that have been found in prior research to influence the probability of someone being food insecure. (For an overview of that literature in this context see Gundersen and 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:

$$FI^*_c = \hat{\alpha} + \widehat{\beta_{UN}}UN_c + \widehat{\beta_{POV}}POV_c + \widehat{\beta_{MI}}MI_c + \widehat{\beta_{HISP}}HISP_c + \widehat{\beta_{BLACK}}BLACK_c + \widehat{\beta_{OWN}}OWN_c + \widehat{\mu_{2017}} + \hat{v}_s \quad (2)$$

where c denotes a county. The variables POV, MI, HISP, BLACK, and OWN are all based on averages taken from the ACS for 2013 to 2017 in the county-level models and from 2017in the congressional district-level models. The variable UN is based on the 2017 values from BLS for the county-level estimates and 2017 from the ACS for the congressional district models. 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 number of persons. The estimation of (1) gives us point estimates for food-insecurity rates at the county level.

Income Bands within Counties (and Congressional Districts)

Food-insecurity rates are also estimated for those above or 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:

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

and equation (2) is specified as:

$$FIC^*_c = \hat{\alpha} + \widehat{\beta_{UN}}UN_c + \widehat{\beta_{HISP}}HISP_c + \widehat{\beta_{BLACK}}BLACK_c + \widehat{\beta_{OWN}}OWN_C + \widehat{\mu_{2017}} + \hat{v}_s \quad (2')$$

In this case, (1') is estimated on the following sample: We limit the estimation to those with incomes within a particular income range (e.g., below 130 percent of the poverty line) but UN, BLACK, HISPANIC, and OWN 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 Appendix Table 1. With this information, we proceed as 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 may help 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., 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, what this leads to is 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%) is 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.

Child Population 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 variable, which is 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.

Second, we define child food insecurity in the following manner. There are three measures of food insecurity related to children (Coleman-Jensen et al. 2018, Table 1B). The first, and 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 Core Food Security Module (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. (2018) – 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, in light of 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 2001-2017. While the CFSM has been on the CPS since 1996, it was previously on months other than December. To avoid issues of seasonality and changes in various other aspects of survey design, e.g., the screening questions, only the post-2001 years are used.

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, 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 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 the

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 Level

For information at the county level (i.e., the information used to estimate equations (2) and (2')), we used information from the 2013-2017 five-year ACS estimates and unemployment data from the BLS. 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. Information about unemployment at the county level was taken from information from the BLS's labor force data by county, 2017 annual averages. For information at the congressional district level, including unemployment data (i.e., the information used to estimate equation (2)), we used information from the 2017 one-year ACS estimates. For both county and congressional districts, ACS data were drawn from tables S1701 (poverty rate), C17002 (ratio of income to poverty level), B19013 (median income), DP04 (homeownership rate), and DP05 (percent African-American and percent Hispanic). For congressional districts, unemployment data were drawn from S2301. All 3,142 counties provided by the Census Bureau were included in the analysis.

For information at the child level, ACS data were drawn from tables S1701 (poverty), B17024 (ratio of income to poverty level), B19125 (household median income), B09001I (number of Hispanic children), B09001B (number of African-American children), and B25115 (homeownership). 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 2. 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), there are several points worth emphasizing from these results. First, as expected, the effects of unemployment and poverty are especially strong. A one percentage point increase in the unemployment rate leads to a 0.52 percentage point increase in food insecurity, while a one percentage point increase in the poverty rate leads to a 0.25 percentage point increase. Second, median income has a statistically insignificant effect on the food-insecurity rate. The proportion of a state's population that is African

American, however, does have a statistically significant effect on food insecurity (a one percentage point increase in the share of a state's population that is African American leads to a 0.11 percentage point increase in food insecurity). The proportion of a state's population that is Hispanic also has a statistically significant effect: a one percentage point increase in the share of a state's population that is Hispanic leads to a 0.15 percentage point decrease in food insecurity. Third, states with higher proportions of homeowners have lower rates of food insecurity. A one percentage point increase in the proportion of a state's population that are homeowners leads to a 0.09 percentage point decrease in food insecurity. Fourth, at least as reflected in the variables used to predict food insecurity in our models, the continued high level of food insecurity in 2017 is unexpected. This can be seen in the positive and statistically significant coefficient on the year fixed effect for 2017.

The results for the various income categories (i.e., columns (2) through (6)) are broadly similar to those found for the full population, with a few differences. For example, while still negative, the effect of homeownership is statistically insignificant for all the income categories and the effect of the proportion of a state that is Hispanic is statistically insignificant for all income categories albeit also negative in sign.

In Table 3, we present the results for children. Overall, the results are similar to those for the full population, so here we emphasize two areas where they differ. First, the effect of homeownership is statistically insignificant for both all incomes (column (1)) and when incomes are restricted to under 185 percent of the poverty line (column (2)). Second, with the exception of 2008, 2009, and 2014 for all incomes, and 2005 and 2010 for those under 185 percent of the poverty line, the year fixed effects are statistically insignificant. One interpretation is that the observed factors, including state fixed effects, explain more of the variation in the child food-insecurity rates in comparison to those for the full population.

We conducted a series of tests of the *Map the Meal Gap* results to see how well the models performed. Our tests included, among other tests, 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.)

Trends in County Food Insecurity Rates between 2011 and 2017

This report reviews findings from the ninth year that Feeding America has conducted the *Map the Meal Gap* analysis. Here, we consider how food-insecurity rates and numbers in 2017 compare to those in the previous six years to identify any notable shifts. (We made a similar comparison for 2011 to 2016 in last year's MMG Technical Brief for the full population and for children.) Food-insecurity estimates at the county level may be less stable from year to year than those at the state or national level due to smaller geographies, particularly in counties with small populations. Efforts are taken to guard against unexpected fluctuations that can occur in these populations by using the five-year averages from the ACS for key variables, including poverty, median income, homeownership, and the percent of the population that is African American or Hispanic. However, the other key variable in the model—unemployment—is based on a one-year estimate for each county as reported by the BLS. The model looks at the relationship between all of these variables and the rate of food insecurity as reported by USDA in order to generate the estimates.

Nationally, the food-insecurity rate declined between 2016 (12.9 percent) and 2017 (12.5 percent) (Coleman-Jensen et al., 2018). The same occurred in regards to the national child food-insecurity rate (17.5 percent to 17.0 percent).

Only a handful of counties saw a statistically significant change in their food insecurity rates. Only about one percent (35) of all 3,142 counties experienced a statistically significant change between 2016 and 2017, most of which were decreases. The number of counties with statistically significant changes is substantially higher at 10 percent (329) since 2015, 25 percent (799) since 2014, 42 percent (1,314) since 2013, 31 percent (987) since 2012, and 33 percent (1,028) since 2011.

Those counties that experienced a 2.5-percentage point or greater change in their food-insecurity estimates between 2016 and 2017 were flagged for further examination (see Appendix B). Out of 3,142 counties analyzed, only nine experienced changes in food-insecurity rates equal to or beyond the threshold of 2.5 percentage points, most of which were decreases. The list of these counties can be found in Appendix B. All of these counties have populations of less than 20,000.

Child food-insecurity rates are, as covered above, on average higher than overall food insecurity rates. As such, we only list counties with more than four

percentage point changes in child food-insecurity rates. As seen in Appendix C, there are 13 counties with a child population of at least 1,000 that fell into this category. These are similar to the changes seen for the full population in that most of them are decreases. However, the counties seeing changes in child food insecurity of at least four percentage points differ from the changes seen for the full population in that all of them have an estimated child population of under 5,000.

FOOD BUDGET SHORTFALL

METHODS

In an effort to 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, as a consequence, 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 $16.99 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." We have assumed that these responses therefore incorporate days of the week in question during which the household was able to meet its food needs and days during which it needed more money. This assumption is supported by the dollar amount reported, which amounts to approximately 5.6 meals per week (or fewer than two days per week, assuming three meals per day), and the inclusion of food-insecure households which reported needing $0 more per week. 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

In addition to being food insecure only some days of any month in which they experience food insecurity, not all food-insecure households experience food insecurity every month. As reported by the USDA, in the annual report *Household Food Security in the United States*, "the average household that was food insecure at some time during the year experienced this condition in 7 months of the year." (Coleman-Jensen et al., 2018)

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

January	February	March	April	May	June

July	August	September	October	November	December

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 his/her food needs, we used information from the 2017 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 (a) households experiencing food insecurity any time over the prior 12 months and (b) 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 $16.99 was selected both 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. We note that the food budget shortfall decreased between 2016 and 2017 ($17.26 - in 2017 inflation-adjusted dollars - to $16.99), and that this is the second year that this figure has decreased, following four years of increases between 2012 and 2015.

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 and that they need to spend more on food. 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 2017 was $16.99 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 better-off individuals; 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. In order to estimate the *local* food budget shortfall, therefore, we worked with Nielsen to incorporate differences in the price of food that exist across counties in the continental U.S. To do so, Nielsen 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" (fareshare.net/conversions-volume-to-weight.html). 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 impacted 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 Nielsen 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.

In an effort 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 D).

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 as follows: $IVTFP=VTFP_{cs}/AVTP$ where AVTP is the weighted average value of the TFP across all counties. We then create a value for the cost to alleviate food insecurity that incorporates these price differences. This is calculated for each county as $CAFI_{cs}=IVTFP_{cs}*PPC*52*(7/12)*FI_{cs}*N_{cs}$.

DATA

To calculate the differences in food costs across counties, we used information from the Nielsen Scantrack service. This includes prices paid for each UPC code in over 65,000 stores across the U.S. For all these analyses we are using data for a 4-week period in October 2016.

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 be able to discuss the "meals" or "meal equivalents" represented by these dollar values. In an effort to provide the necessary information to allow for this communication tool, we calculated an approximation of the number of meal equivalents represented by the county-level food budget shortfall as follows.

On 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 $3.00. 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 $MCAFI_{cs}=(IVTFP_{cs}*PPC*52*(7/12)*FI^*_{cs}*N_{cs})/(IVTFP_{cs}*3.02)$.

The *Map the Meal Gap 2019* meal-cost analysis includes all observations from the sample of CPS responses to the question regarding weekly household food expenditures in the calculations of the 2017 national average and local meal cost values as in previous years of *Map the Meal Gap*. 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 2017 CPS.

REFERENCES

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TECHNICAL APPENDICES AND TABLES
APPENDIX A: SNAP AND NSLP THRESHOLDS

In order to be most useful for planning purposes, SNAP thresholds effective by January 1, 2019 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 National School Lunch Program, Special Supplemental Nutrition Program for Women, Infants, and Children (WIC), etc.

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

APPENDIX B: COUNTIES WITH FOOD-INSECURITY RATE CHANGES OF 2.5 PERCENTAGE POINTS OR MORE

State	County	2016 Food-Insecurity Rate	2017 Food-Insecurity Rate	Change from 2016 to 2017	Total Population (2017)
Alabama	Conecuh	23.9%	20.9%	-3	12,649
Alabama	Wilcox	32.3%	29.3%	-3	10,919
Arkansas	Nevada	23.0%	20.2%	-2.8	8,528
Georgia	Early	23.3%	20.7%	-2.6	10,405
Mississippi	Humphreys	33.7%	30.8%	-2.9	8,678
Mississippi	Sharkey	29.3%	26.7%	-2.6	4,631
South Dakota	Jackson	18.5%	21.4%	2.9	3,275
Texas	Dimmit	7.8%	10.4%	2.6	10,822
Texas	Morris	24.8%	22.1%	-2.7	12,530

APPENDIX C: COUNTIES WITH CHILD FOOD-INSECURITY RATE CHANGES OF 4 PERCENTAGE POINTS OR MORE AND A CHILD POPULATION OF AT LEAST 1,000

State	County	2016 Child Food-Insecurity Rate	2017 Child Food-Insecurity Rate	Change from 2016 to 2017	Total Child Population (2017)
Alabama	Conecuh	30.7%	26.3%	-4.4	2,774
Alabama	Wilcox	34.8%	30.6%	-4.2	2,701
Colorado	Phillips	14.3%	10.0%	-4.3	1,078
Georgia	Echols	24.7%	20.2%	-4.5	1,140
Idaho	Valley	17.5%	13.0%	-4.5	1,861
Iowa	Davis	21.4%	17.2%	-4.2	2,576
Kentucky	Livingston	16.2%	20.2%	4	1,931
Mississippi	Chickasaw	27.1%	23.0%	-4.1	4,320
Missouri	Carter	21.6%	17.3%	-4.3	1,535
Montana	Big Horn	25.8%	30.1%	4.3	4,461
South Dakota	Jackson	24.5%	28.7%	4.2	1,004
Texas	La Salle	20.8%	16.3%	-4.5	1,579
West Virginia	McDowell	32.4%	28.2%	-4.2	3,984

APPENDIX D: 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, as noted below). 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	2017 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	2017 Food Tax (state rate)	2017 Food Tax (weighted average of all county rates)	Total Food Tax (state + county)
AL	4.00%	1.94%	5.94%
AR	1.50%	1.33%	2.83%
IL	1.00%	0.71%	1.71%
KS	6.50%	1.13%	7.63%
MO	1.23%	1.84%	3.07%
OK	4.50%	0.70%	5.20%
TN	4.00%	2.44%	6.44%
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.[15]

State	2017 Food Tax (state rate)	2017 Food Tax (weighted average of all county rates)
AK	0%	0.83%
CO	0%	0.24%
GA	0%	3.03%
LA	0%	2.51%
NC	0%	2.00%
SC	0%	0.70%

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[15] 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.

Table 1: Food Insecurity Questions in the Core Food Security Module (administered in the Current Population Survey)

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.

Table 2: Estimates of the Impact of Various Factors on Food Insecurity at the State Level, 2001-2017

	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 (s.e.)	coefficient (s.e.)	coefficient (s.e.)	coefficient (s.e.)	coefficient (s.e.)	coefficient (s.e.)
Poverty Rate	0.245**					
	(0.046)					
Unemployment Rate	0.518**	0.782**	0.776**	0.736**	0.757**	0.796**
	(0.093)	(0.268)	(0.239)	(0.236)	(0.217)	(0.201)
Median Income	-0.003					
	(0.002)					
Percent Hispanic	-0.146**	-0.259	-0.208	-0.213	-0.212	-0.167
	(0.054)	(0.190)	(0.164)	(0.165)	(0.157)	(0.145)
Percent African-American	0.109*	0.202	0.243	0.253	0.223	0.255
	(0.056)	(0.174)	(0.155)	(0.155)	(0.138)	(0.132)
Percent Homeownership	-0.085*	-0.151	-0.162	-0.179	-0.138	-0.156
	(0.034)	(0.109)	(0.093)	(0.093)	(0.086)	(0.082)
2002 (year fixed effect)	0.000	0.013	0.009	0.009	0.006	0.006
	(0.003)	(0.012)	(0.011)	(0.011)	(0.010)	(0.009)
2003 (year fixed effect)	0.004	0.019	0.017	0.018	0.017	0.014
	(0.004)	(0.015)	(0.013)	(0.013)	(0.013)	(0.011)
2004 (year fixed effect)	0.014**	0.033*	0.030**	0.029**	0.005	0.026**
	(0.004)	(0.013)	(0.011)	(0.011)	(0.011)	(0.009)
2005 (year fixed effect)	0.010*	0.028*	0.022	0.018	-0.006	0.016
	(0.004)	(0.013)	(0.012)	(0.012)	(0.010)	(0.009)
2006 (year fixed effect)	0.015**	0.036**	0.031**	0.031**	0.003	0.027**
	(0.003)	(0.012)	(0.010)	(0.010)	(0.010)	(0.008)
2007 (year fixed effect)	0.021**	0.027*	0.045**	0.045**	0.018*	0.041**
	(0.004)	(0.013)	(0.011)	(0.011)	(0.010)	(0.009)
2008 (year fixed effect)	0.042**	0.066**	0.069**	0.059**	0.058**	0.069**
	(0.004)	(0.012)	(0.010)	(0.011)	(0.011)	(0.010)

2009 (year fixed effect)	0.027**	0.045**	0.050**	0.041**	0.041**	0.050**
	(0.005)	(0.015)	(0.014)	(0.014)	(0.013)	(0.012)
2010 (year fixed effect)	0.022**	0.022	0.026	0.028*	0.026*	0.036**
	(0.006)	(0.016)	(0.014)	(0.014)	(0.013)	(0.012)
2011 (year fixed effect)	0.021**	0.039**	0.042**	0.042**	0.042**	0.041**
	(0.005)	(0.015)	(0.014)	(0.014)	(0.013)	(0.011)
2012 (year fixed effect)	0.023**	0.055**	0.049**	0.048**	0.038**	0.045**
	(0.005)	(0.014)	(0.012)	(0.012)	(0.012)	(0.010)
2013 (year fixed effect)	0.026**	0.065**	0.055**	0.056**	0.046**	0.054**
	(0.005)	(0.013)	(0.012)	(0.012)	(0.012)	(0.010)
2014 (year fixed effect)	0.030**	0.060**	0.056**	0.056**	0.052**	0.057**
	(0.005)	(0.014)	(0.012)	(0.012)	(0.012)	(0.011)
2015 (year fixed effect)	0.027**	0.063**	0.058**	0.057**	0.050**	0.053**
	(0.005)	(0.014)	(0.011)	(0.011)	(0.011)	(0.010)
2016 (year fixed effect)	0.024**	0.054**	0.051**	0.051**	0.030**	0.047**
	(0.005)	(0.014)	(0.012)	(0.012)	(0.011)	(0.010)
2017 (year fixed effect)	0.024**	0.045**	0.045**	0.043**	0.022	0.042**
	(0.005)	(0.014)	(0.012)	(0.012)	(0.011)	(0.010)
Constant	0.123**	0.406**	0.382**	0.395**	0.359**	0.345**
	(0.028)	(0.080)	(0.069)	(0.070)	(0.064)	(0.061)

* $p < 0.05$ ** $p < 0.01$. The omitted year for the year fixed effects is 2001. The data used is taken from the December Supplements of the 2001-2017 Current Population Survey.

Table 3: Estimates of the Impact of Various Factors on Child Food Insecurity at the State Level, 2001-2017

	Full Population	<185% of the poverty line
	coefficient (s.e.)	coefficient (s.e.)
Poverty Rate	0.262**	
	(0.056)	
Unemployment Rate	0.813**	1.265**
	(0.176)	(0.296)
Median Income	-0.002	
	(0.002)	
Percent Hispanic	-0.060	-0.171
	(0.054)	(0.108)
Percent African-American	-0.032	-0.124
	(0.061)	(0.113)
Percent Homeownership	-0.018	0.043
	(0.043)	(0.080)
2002 (year fixed effect)	-0.005	-0.028
	(0.008)	(0.015)
2003 (year fixed effect)	-0.000	-0.023
	(0.009)	(0.020)
2004 (year fixed effect)	0.007	-0.016
	(0.009)	(0.018)
2005 (year fixed effect)	-0.005	-0.034*
	(0.008)	(0.016)
2006 (year fixed effect)	0.001	-0.018
	(0.008)	(0.016)
2007 (year fixed effect)	0.007	-0.021
	(0.008)	(0.016)
2008 (year fixed effect)	0.044**	0.025
	(0.008)	(0.015)
2009 (year fixed effect)	0.021*	-0.012
	(0.011)	(0.019)
2010 (year fixed effect)	-0.005	-0.049*
	(0.011)	(0.020)
2011 (year fixed effect)	-0.005	-0.031
	(0.011)	(0.020)
2012 (year fixed effect)	0.005	-0.017
	(0.010)	(0.018)
2013 (year fixed effect)	0.012	0.007
	(0.010)	(0.019)
2014 (year fixed effect)	0.012	-0.008

	(0.010)	(0.017)
2015 (year fixed effect)	-0.000	-0.016
	(0.009)	(0.017)
2016 (year fixed effect)	-0.010	-0.030
	(0.009)	(0.016)
2017 (year fixed effect)	-0.004	-0.030
	(0.010)	(0.018)
Constant	0.120**	0.292**
	(0.038)	(0.064)

* $p<0.05$ ** $p<0.01$. The omitted year for the year fixed effects is 2001. The data used are taken from the December Supplements of the 2001-2017 Current Population Survey.

Table 4: Breakdowns of Weekly Cost to be Food Secure (in $) in 2017

	Individuals	Households
All Food Insecure	$16.99	
By Household Size		
1 person		$25.64
2 person		$33.07
3 person		$38.44
4 person		$41.98
5 person		$43.02
6 person		$52.47
By Income Categories		
<130% of poverty line	$18.39	
>130% of poverty line	$15.29	
<185% of poverty line	$18.31	
>185% of poverty line	$14.45	
By food security status		
Marginally food secure	$7.40	
Low food secure	$12.20	
Very low food secure	$24.73	

The data used are taken from the December Supplement of the 2017 Current Population Survey.

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