Map the Meal Gap: Exploring Food Insecurity at the Local Level

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Food insecurity is a serious challenge facing millions of Americans. In 2010, approximately 49 million persons in the United States lived in households classified as food insecure (Coleman-Jensen et al., 2011). These rates have soared to unprecedented levels, having increased by more than one-third since 2007. The prevalence of food insecurity is of great concern to policymakers and program administrators, a concern heightened by its many demonstrated negative health consequences. The alleviation of food insecurity is the central goal of the Supplemental Nutrition Assistance Program (SNAP), the largest food assistance program in the United States. Along with SNAP, food assistance is provided through Feeding America's network of member food banks and other federal programs. Due in large part to food insecurity's status as one of the most important and high profile nutrition-related public health issues in the United States today, a vast body of literature has emerged on the topic. (For a review see Gundersen et al., 2011.)

One missing aspect of the literature on food insecurity has been a description of the spatial diversity in food insecurity across the U.S. In response, via a large-scale effort titled Map the Meal Gap, Feeding America recently released estimates of food insecurity at the county level for all counties in the U.S. Briefly, these estimates were derived using a two-step process. First, the relationship between various factors (e.g., the unemployment rate) and food insecurity were estimated at the state level. This relationship was developed using data primarily from the 2001 through 2010 December Supplement from the Current Population Survey. Second, using the coefficients estimated in the first step and the same variables defined at the county level, the extent of food insecurity for all counties was established. This imputation method primarily used county-level information from the 2006-2010 American Community Survey. This approach was then repeated for the child population. Both the overall and child population estimates were greeted with a great deal of attention from the media, policymakers, and program administrators.

In addition, Map the Meal Gap is being utilized as a new tool by Feeding America's member food banks for targeting programs; tailoring food distribution programs; and framing strategic planning and goals.

In this paper, we enhance the Map the Meal Gap by considering four key questions: *How have the state-level determinants of food insecurity (full population and for children) at the county level changed from 2009 to 2010? How do the determinants of food insecurity at the county level differ between the full population and children? What is the geographic diversity in food insecurity rates across the United States? Where did food insecurity rates change from 2009 to 2010?*

Methods

We proceed in two steps to estimate the extent of food insecurity in each county[1].

Step 1: Using state-level data from 2001-2010 (described below), we estimate a model where the food insecurity rate for individuals at the state level is determined by the following equation:

$$FI_{st} = \alpha + \beta_{UN}UN_{st} + \beta_{POV}POV_{st} + \beta_{MI}MI_{st} + \beta_{HISP}HISP_{st} + \beta_{BLACK}BLACK_{st} + \mu_t + \upsilon_s + \varepsilon_{st}$$

(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, 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

[1] Map the Meal Gap also presents results for all Congressional Districts in the U.S. We do not cover those results but, analytically, the methods to derive those are the same as discussed here. For information on the results for Congressional Districts see Feeding America 2011a; 2011b.

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. Our estimates of the proportion of children in food insecure households also use equation (1) except that poverty, median income, percent Hispanic, and percent African-American are all defined for households with children. The unemployment rate, though, continues to be defined for all persons, rather than just for those in households with children.

Our choice of variables was first guided by the literature on the determinants of food insecurity insofar as we included variables that have been found to influence the probability of someone being food insecure. Next, we chose variables that are available both in the Current Population Survey and that are available at the county level in the American Community Survey (described below). Variables that are not available at both the state and county level cannot be used in our models.

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 all other observed and unobserved 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:

$$FI^{*}_{cs} = \hat{\alpha} + \widehat{\beta_{UN}} UN_{cs} + \widehat{\beta_{POV}} POV_{cs} + \widehat{\beta_{MI}} MI_{cs} + \widehat{\beta_{HISP}} HISP_{cs} + \widehat{\beta_{BLACK}} BLACK_{cs} + \widehat{\mu_T} + \widehat{\nu_s}$$

(2)

where c denotes a county and T denotes the year from which the county level variables are defined. 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 $FI^{*}_{cs}*N_{cs}$ where N is the number of persons. A similar method is employed for children.[2]

Data

The information at the state level (i.e., the information used to estimate equations (1)) is derived from the Core Food Security Module (CFSM) in the December Supplement of the Current Population Survey (CPS) for the years 2001-2010. 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 from 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 did so in a similar

[2] In Map the Meal Gap we further derive food insecurity rates by income categories. For all individuals, we consider breakdowns for below the state-specific gross-income SNAP threshold, between the SNAP threshold and 185% of the poverty line (when the threshold is less than that level), and above 185% of the poverty line (or, if it is higher, the SNAP threshold). For all children, food insecurity rates for below and above 185% of the poverty line are derived. This cutoff is chosen since it is the cutoff for eligibility for reduced price meals through the National School Lunch Program (NSLP). We do not cover these income breakdowns in this paper. For information on these results see Feeding America 2011a, 2011b and for information on the estimation results, see Gundersen et al. 2011b, 2011c.

manner when looking at children albeit, as discussed above, the unemployment rate is the same for both samples.

For information at the county level (i.e., the information used to estimate equation (2) and (2')), we used information from the 2006-2010 five-year American Community Survey (ACS) estimates. The ACS is a sample survey of 3 million addresses administered by the Census Bureau. In order to provide estimates for areas with small populations, this sample was accumulated over a 5-year period. Information about unemployment at the county level was taken from information from the Bureau of Labor Statistics' labor force data by county, 2010 annual averages. In 2010, all counties provided by the Census Bureau (geographic summary level 050) were included in the analysis.[3]

For information at the congressional district level, including unemployment data (i.e., the information used to estimate equation (2)), we used information from the 2010 1-year American Community Survey (ACS) estimates[4]. For both county and congressional districts, data was drawn from tables C17002 (ratio of income to poverty level), B19013 (median income), B2001 (percent African-American) and B3002 (percent Hispanic).

Results

In this section we consider two broad sets of results. We begin with a consideration of the determinants of food insecurity at the state level by addressing the first two questions from above, namely *How have the state-level determinants of food insecurity (full population and for children) at the county level changed from 2009 to 2010?* and *How do the determinants of food*

[3] In 2009, a total of 3,137 counties were analyzed out of the 3,143 for which data is provided by the Census Bureau. For three counties (two in Alaska and one in Hawaii), the Bureau of Labor Statistics did not provide 2009 Unemployment data. For three additional counties (all in Alaska), the county-defined area changed between 2008 and 2009. Because the model relies on data over time, we elected to exclude them from our 2009 analysis. In 2010, data was available through the ACS and BLS for all 3,143 counties.

[4] In 2009, this analysis used information from the 2005-2009 ACS to estimate food insecurity at the congressional district level. In 2010, all the information we needed for congressional districts became available within the 2010 1-year ACS. Therefore, we used this dataset to estimate food insecurity for congressional districts.

insecurity at the county level differ between the full population and children? Below we then consider our other two central questions: *What is the geographic diversity in food insecurity rates across the United States? Where did food insecurity rates change from 2009 to 2010?*

Determinants of Food Insecurity at the State Level

The results of the estimation of equation (1) for the full population can be found in column (1) of Table 1.[5] Before turning to how things changed from 2009 to 2010, there are several points worth emphasizing from these results. First, as expected the effects of unemployment and poverty are especially strong with unemployment having a slightly stronger impact. Evaluated at mean levels, a one percent increase in the unemployment rate leads to a 0.31 percent increase in food insecurity while a one percent increase in the poverty rate leads to 0.26 percent increase. Second, the proportion of a state's population that is Hispanic or African-American and median income have no statistically significant effect on the food insecurity rate. This is primarily due to the small changes that occur over time at the state level in these variables. Third, at least as reflected in the variables used to predict food insecurity in our models, the substantial changes in food insecurity from 2008 through 2010 were unexpected. This can be seen in the distinctly larger coefficients on the year fixed effects in these years, with an especially pronounced increase in 2008.[6] Of potential interest, though, is that the statistically significantly positive year fixed effects began in 2006.

The results for 2009 (i.e., when we estimate our models using data from 2001 to 2009) can be found in column (2). As seen in a comparison with column (1), for most variables, there was not much change. The only variable where there was a non-trivial change was for the

[5] The general patterns noted for food insecurity among all persons also hold for children. We therefore concentrate on these results.

[6] The omitted year is 2001.

unemployment variable. The influence on estimated food insecurity rates at the county level are small, though. As an example, consider two counties in the same state with everything equal except a one percentage point difference in the unemployment rate. In 2009, the county with a higher unemployment rate would have had a 0.784 higher estimated food insecurity rate in 2009 versus a 0.672 higher estimated food insecurity rate in 2010.

In columns (3) and (4) of Table 1 are the results for children. In our discussion here, we first concentrate on how the results compare with those for all individuals. First, like with all individuals, the effects of poverty and unemployment are statistically significant and substantial. Second, in contrast to the full population, the effect of child poverty rates, as measured by elasticities, is stronger than unemployment. Using the averages over all years, with respect to the poverty rate is 0.28 and the elasticity with respect to the unemployment rate is 0.23. Third, the year fixed effects are generally smaller in magnitude in the children results in comparison to the all individual results. In addition, only the 2008 year fixed effect is statistically significant for the children estimates.

Like for all individuals, we now compare the results when we used data from 2001-2010 with those from 2001-2009. As seen in a comparison of columns (3) and (4), for most variables, there was not much change. One exception is for the unemployment rate. Like for all individuals, its effect became smaller in 2001-2010. As an example, consider two counties in the same state with everything equal except a one percentage point difference in the unemployment rate. In 2009, the county with a higher unemployment rate would have had a 0.929 higher estimated food insecurity rate in 2009 versus a 0.775 higher estimated food insecurity rate in 2010.

Food insecurity rates at the county level

We now turn to a discussion of the geographic differences in food insecurity across the United States. In Table 2, column (1) we display the food insecurity rates for all individuals for each state within our estimates.[7] State level food insecurity rates vary from a low of 7.7% in North Dakota to a high of 21.8% in Mississippi.

The dispersion among counties is, by definition, even more pronounced. This can be seen by a comparison of columns (2) and (3) where, for each state we list the highest and lowest food insecurity rate. The food insecurity rates range from 4.5% in Steele, North Dakota, while the county with the highest rate was Holmes, Mississippi at 37.4%. Another point regarding dispersion of food insecurity rates found in comparing columns (2) and (3) is that the county with the highest food insecurity rate in some states is lower than the lowest food insecurity rate in other states. To give the first example of this comparison seen in the table, the highest rate for a county in Connecticut (14.0% - New Haven County) is lower than the lowest rate for a county in Arizona (16.0% - Cochise County).

In column (4), we further illustrate the geographic dispersion in food insecurity rates across counties, this time by looking within States.[8] The two states with the widest gaps are Georgia (Hancock County, 35.9%; Forsyth County, 10.2%) and Alabama (Wilcox County, 36.4%; Shelby County, 10.7%). The smallest gap is in Delaware – 1.5%.

Another approach to understanding geographic dispersion is to subset the analysis to counties in the top 10% of food insecurity rates across the 3,143 counties. Although the average

[7] The food insecurity rates for states are calculated based on the aggregation of Congressional Districts estimated food insecurity rates. These are based on annual rather than three year estimates and, thus, differ from the three year averages found in, e.g., Coleman-Jensen et al. (2011).

[8] Within state comparisons are useful for many reasons. One technical reason emerging from our estimation strategy is that food insecurity rates are normalized to some extent by the inclusion of the state fixed effects.

of all the U.S. counties' food insecurity rates is nearly 16%, the average food insecurity rate for these 321 "high food insecurity rate" counties is 24%.

These counties are more likely to be non-metro or micropolitan rather than metropolitan. While micropolitan counties and non-metro counties constitute 21.9% and 43.1% of counties, respectively, they contain 28.3% and 55.1% of high food insecurity counties. The high food insecurity rate counties are found in eight of the nine census divisions identified by the U.S. Census Bureau. The heaviest concentrations of these counties are found in the East South Central and South Atlantic states. While the New England division is not represented in the high food insecurity rate counties, it should be noted that this area does include some of the most populous counties in the U.S. and thus, has some of the largest numbers of food insecure individuals.

We now consider how the racial and ethnic composition of counties contribute to whether or not a county is in the top 10% of food insecure counties. Although a relatively small percentage of the food insecure population in the U.S. is identified as American Indian, county-level analysis brings into sharp relief the challenges for these communities in certain areas of the country. Among the counties with food insecurity rates in the top 10%, 12 are cases where American Indians make up more than a quarter of the population. In nine of these counties, they represent more than 50% of residents.[9] Not unexpectedly, these 12 counties face a disproportionately high level of poverty: an average of their 2010 poverty rate was 36% versus an average of 26% for all high food insecurity rate counties and nearly 16% for all U.S. counties. The largest counties with a sizeable population of American Indians and high rates of food insecurity include Navajo County, Arizona (44% American Indian, 24% food insecure), which includes parts of the Hopi, Fort Apache and Navajo Nation reservations and Robeson, North

[9] One should note that there are only 25 counties in the U.S. that are majority American Indian.

Carolina (37% American Indian, 23% food insecure), which includes many Lumbee tribe members, one of the larger non-reservation tribes. Three of the counties with very high percentages of American Indians in the high food insecurity rate group are located in South Dakota.

Along with counties with high proportions of American Indians, counties with high proportions of African-Americans are highly concentrated in the highest food insecurity rate counties. In 2010, 91% of the 104 majority African-American counties were in the highest food insecurity rate group. Many of the African American-majority counties are fairly small in population but there are also several counties with an estimated food insecure population in excess of 100,000, including Baltimore City, Maryland; Dekalb, Georgia; and Shelby, Tennessee. All of the African American majority counties continued to suffer from a higher-than-average poverty rates and the 95 counties that also have the highest food insecurity rates had a slightly higher average poverty rate. In addition, the average unemployment rate for this group was 13%.

Unlike counties with high proportions of American Indians and African-Americans, counties with majority Latino populations had a lower incidence of counties that fell into the highest food insecurity rate group -- about one in six. This holds despite the high poverty and unemployment rates found in some of these counties. This is primarily because, as seen in Table 1, column (1), the coefficient on percent Hispanic is negative and not small.

Before turning to how food insecurity rates changed from 2009 to 2010, we briefly consider the distribution of child food insecurity rates. Child food insecurity rates have always been substantially higher than those of the general population. The results akin to Table 2 are found in Table 3. State level food insecurity rates vary from a low of 10.9% in North Dakota to a high of 30.4% in Washington, DC. As seen in a comparison of columns (2) and (3) the child food insecurity rates range from 5.4% (Bowman County, North Dakota) to 48.9% (Zavala County, Texas). As with food insecurity rates for the full population, the highest county food insecurity rate in some states is lower than the lowest food insecurity rate experienced in other states. For example, the highest child food insecurity rate in Delaware (Sussex County, 19.8%) is lower than the lowest rate in Arkansas (20.7% - Lawrence County).

In column (4), we further illustrate the geographic dispersion in child food insecurity rates across counties, this time by looking within States. The state with the widest gap is Texas (Carson County, 17.8%; Zavala County, 48.9%) and Delaware has the lowest gap (New Castle County, 15.9%; Sussex County, 15.9%).

Like we did above, we now consider the geographic dispersion among those counties in the top 10% of child food insecurity rates. These high food insecurity counties are more pervasive in rural areas. Sixty-one percent of these high child food insecurity counties are classified as rural, compared to 43% of counties in the U.S. overall. Twenty-six percent of high child food insecurity counties are found in micropolitan areas, compared to 22% of counties in the U.S overall. Only 13% of high child food insecurity rate counties are found in metropolitan areas, although 35% of all counties are classified as metropolitan. Counties with high child food insecurity rates are concentrated in the East South Central, South Atlantic and West South Central regions. None of the counties in the New England census region fall into the highest child food insecurity group, but it should be noted that approximately 18% (12 out of 67) of those New England counties still have child food insecurity rates above the average of all U.S. counties (23%) and some of the most populous counties in New York contain a very high number of food insecure children.

Arizona, Georgia, Mississippi, and California lead the nation with the highest percentage of their counties in the top 10% of counties with the highest child food insecurity rates (more than 30% of the counties in these states fall into the top 10 percent nationwide).

Trends from 2009 to 2010

We now turn to a discussion of how county food insecurity rates changed from 2009 to 2010. Nationally, the food insecurity rate in 2010 was slightly lower than in 2009 – 16.1% of individuals and 14.5% of households were identified as food-insecure, versus 16.6% of individuals and 14.7% of households in 2009. As at the national level, in general, county-level food insecurity rates across the country also showed modest decline. While, on average, food insecurity rates did decline for counties from 2009 to 2010, only 17 counties experienced declines in food insecurity rates above 4 percentage points. (These counties are found in Table 4.) In 12 of these counties, the unemployment rate declined by a substantial amount, and in the remaining five where the unemployment rate had not fallen by a substantial amount, the poverty rate declined. It is interesting to note that the five counties with a combination of higher unemployment but lower poverty rates were all located in Texas and that all of these had a high percentage of Latino residents. In all five of these counties, more than four out of five individuals are Hispanic. Most of the counties that experienced declines in their food insecurity rates are relatively small in population – the largest include Elkhart, Indiana, with an estimated food insecure population of more than 33,000 in 2010 and Starr County, Texas, with more than 15,000 individuals estimated to be struggling with food insecurity.

Overall, national food insecurity rates for households with children also declined slightly from 23.2 % in 2009 to 21.6% 2010. At the county level, there were a larger number of counties that experienced declines in child food insecurity rates than the overall population. Specifically, there were 95 counties that experienced declines in child food insecurity rates above 6 percentage points. (These counties are found in Table 5.) In 23 of these counties, the unemployment rate declined by a substantial amount. More than half of these counties are located in Tennessee and the number of food insecure children range from a low of 3,700 in Clay, Tennessee to a high of 42,300 children in Greene, Tennessee. In 58 counties, the poverty rate declined by a substantial amount also influencing the decline in the child food insecurity rates. For 10 counties, there were multiple variables, including a combination of declines in both unemployment and poverty rate, that influenced the child food insecurity rates.

There were five counties that experienced an increase in their food insecurity estimate of 4% or greater between 2009 and 2010. All are relatively small counties located in the South (three in Georgia and one each in Alabama and Louisiana). All five counties have majority African American, populations ranging from 55% to 85% of the population. The unemployment rate rose between 2009 and 2010 in all five of these counties and in four of the five counties, the poverty rate also went up, markedly in some cases. There were only two counties that experienced an increase in their child food insecurity rates greater than 6 percentage points (Loup, Nebraska and Quitman, Georgia). Both of these counties are very small in population and the number of food insecure children is only 140 in Loup, Nebraska and 600 in Quitman, Georgia. In both counties, the unemployment and poverty rates increased substantially from 2009 to 2010. Poverty rates increased by more than 23% in both counties with nearly half of the population living at or below the poverty line.

Conclusion

Food insecurity rates have soared to unprecedented levels in recent years becoming one of the most important and high profile nutrition-related public health issues in the United States. However, prior to *Map the Meal Gap*, our understanding of the spatial diversity in food insecurity rates across the United States had been lacking. The findings presented here on *Map the Meal Gap* document the geographic diversity in food insecurity rates by detailing food insecurity rates for all counties in the United States.

Though we reviewed the geographic variations in food insecurity rates in light of income, poverty and racial and ethnic composition of communities, we encourage others to also examine how county-level food insecurity data can be paired with other indicators, such as health data, housing cost pressures and other measures of economic status. It is also our hope that *Map the Meal Gap* equips food banks, partner agencies, policy makers, business leaders, community activists and concerned citizens with the tools needed to better understand the dynamics of food insecurity at the county level and to use this information to better inform discussions about how to respond to the need locally.

Table 1: Estimates of the State-Level Determinants of Food Insecurity

	2001-2010	2001-2009	2001-2010	2001-2009
	coefficient (s.e.)	coefficient (s.e.)	coefficient (s.e.)	coefficient (s.e.)
	All	All	Children	Children
	(2)	(1)	(4)	(3)
Poverty Rate	0.245	0.266	0.331	0.368
	(0.056)**	(0.060)**	(0.081)**	(0.0893)**
Unemployment Rate	0.671	0.784	0.775	0.929
	(0.118)**	(0.150)**	(0.227)**	(0.281)**
Median Income	-0.002	-0.003	-0.002	-0.001
	(0.002)	(0.003)	(0.004)	(0.004)
Percent Hispanic	-0.052	-0.023	0.033	0.038
	(0.079)	(0.083)	(0.081)	(0.087)
Percent African-American	0.117	0.062	-0.136	-0.181
	(0.083)	(0.088)	(0.087)	(0.093)
2002 (year fixed effect)	-0.002	-0.003	-0.004	-0.006
	(0.003)	(0.003)	(0.007)	(0.007)
2003 (year fixed effect)	-0.000	-0.002	-0.003	-0.006
	(0.004)	(0.004)	(0.009)	(0.009)
2004 (year fixed effect)	0.010	0.009	0.005	0.003
	(0.004)**	(0.004)*	(0.008)	(0.008)
2005 (year fixed effect)	0.006	0.006	-0.008	-0.009
	(0.004)	(0.004)	(0.008)	(0.008)
2006 (year fixed effect)	0.012	0.013	-0.002	-0.003
	(0.004)**	(0.004)**	(0.008)	(0.008)
2007 (year fixed effect)	0.018	0.019	0.005	0.004
	(0.004)**	(0.004)**	(0.008)	(0.008)
2008 (year fixed effect)	0.038	0.040	0.041	0.039
	(0.004)**	(0.004)**	(0.009)**	(0.009)**
2009 (year fixed effect)	0.018	0.014	0.019	0.0101
	(0.006)**	(0.008)	(0.013)	(0.015)
2010 (year fixed effect)	0.013		-0.009	
	(0.006)*		(0.014)	
Constant	0.054	0.051	0.106	0.0887
	(0.017)**	(0.019)**	(0.032)**	(0.036)*

** p<0.01; * p<0.05

Table 2: Differences in Food Insecurity Rates by State and by Counties within States

	Average FI Rate (%)	Highest County FI Rate (%)	Lowest County FI Rate (%)	Difference
AK	14.6	27.4	9.1	18.3
AL	19.2	36.4	10.7	25.7
AR	19.2	28.8	12.9	15.9
AZ	19.0	27.1	16.0	11.1
CA	17.1	27.6	12.2	15.4
CO	15.5	22.0	9.6	12.4
CT	13.8	14.0	10.5	3.5
DC	16.5	16.5	16.5	0.0
DE	12.8	12.7	11.2	1.5
FL	19.2	25.5	12.6	12.9
GA	19.9	35.9	10.2	25.7
HI	14.0	15.8	11.8	4.0
IA	13.4	15.7	9.4	6.3
ID	17.0	22.0	13.2	8.8
IL	15.0	20.4	9.2	11.2
IN	16.2	19.0	9.9	9.1
KS	15.0	20.3	8.1	12.2
KY	17.3	25.1	11.7	13.4
LA	16.7	30.7	8.7	22.0
MA	12.3	14.6	8.9	5.7
MD	12.8	21.7	7.3	14.4
ME	14.9	18.6	12.7	5.9
MI	19.0	22.7	10.9	11.8
MN	11.5	16.0	8.0	8.0
MO	17.1	26.0	12.5	13.5
MS	21.8	37.4	12.8	24.6
MT	14.5	21.2	9.8	11.4
NC	19.6	27.8	11.7	16.1
ND	7.7	17.6	4.5	13.1
NE	13.3	19.1	9.2	9.9
NH	10.9	12.2	8.7	3.5
NJ	13.5	18.0	8.3	9.7
NM	18.5	27.0	10.7	16.3
NV	17.5	21.2	10.8	10.4
NY	14.2	20.1	8.5	11.6
OH	18.1	21.2	10.8	10.4
OK	17.7	22.9	12.1	10.8
OR	17.5	20.4	11.8	8.6
PA	14.6	22.0	9.7	12.3
RI	15.3	16.8	12.6	4.2

SC	18.8	34.7	12.1	22.6
SD	12.6	26.5	8.6	17.9
TN	17.6	26.5	9.6	16.9
TX	18.5	25.7	11.6	14.1
UT	17.0	23.4	13.0	10.4
VA	12.4	26.4	5.8	20.6
VT	14.1	16.0	11.5	4.5
WA	15.9	20.5	12.6	7.9
WI	13.3	21.8	8.9	12.9
WV	14.7	21.3	10.8	10.5
WY	12.2	14.3	8.8	5.5

Table 3: Differences in Child Food Insecurity Rates by State and by Counties within States

	Average FI Rate (%)	Highest County FI Rate (%)	Lowest County FI Rate (%)	Difference
AK	20.2	37.5	13.0	24.5
AL	26.8	35.4	19.2	16.2
AR	28.0	34.5	20.7	13.8
AZ	29.4	42.9	24.8	18.1
CA	26.7	43.8	16.8	27.0
CO	22.7	36.4	14.2	22.2
CT	18.6	21.2	14.9	6.3
DC	30.4	30.4	30.4	0.0
DE	18.5	19.8	15.9	3.9
FL	28.3	35.0	20.5	14.5
GA	28.6	40.1	19.7	20.4
HI	21.8	24.9	18.4	6.5
IA	19.5	24.5	13.9	10.6
ID	23.4	30.7	17.2	13.5
IL	22.0	30.2	15.5	14.7
IN	22.7	28.2	14.5	13.7
KS	23.0	32.8	13.6	19.2
KY	22.7	37.3	14.3	23.0
LA	23.3	32.8	17.3	15.5
MA	16.7	21.6	11.6	10.0
MD	17.6	24.2	11.1	13.1
ME	22.2	29.3	19.4	9.9
MI	23.9	32.8	15.2	17.6
MN	16.8	24.9	11.7	13.2
MO	22.6	31.3	17.5	13.8
MS	28.3	36.4	18.7	17.7
MT	20.9	31.3	14.0	17.3
NC	28.2	34.0	19.6	14.4
ND	10.9	26.5	5.4	21.1
NE	21.8	32.1	13.8	18.3
NH	13.9	17.3	11.2	6.1
NJ	18.5	23.8	12.4	11.4
NM	29.2	43.6	12.5	31.1
NV	28.6	33.4	19.6	13.8
NY	20.9	29.1	13.6	15.5
OH	25.5	33.8	16.9	16.9
OK	27.2	34.3	19.2	15.1
OR	29.2	35.0	21.7	13.3

PA	20.0	26.6	13.9	12.7
RI	21.0	23.7	15.9	7.8
SC	27.4	34.7	18.7	16.0
SD	18.2	37.7	12.1	25.6
TN	25.2	36.5	16.6	19.9
TX	28.0	48.9	17.8	31.1
UT	23.0	30.5	15.1	15.4
VA	16.6	32.3	10.1	22.2
VT	20.0	24.5	16.1	8.4
WA	24.6	31.9	18.9	13.0
WI	21.2	34.9	15.1	19.8
WV	20.9	30.6	13.8	16.8
WY	19.5	22.1	12.7	9.4

Table4: Counties with Changes in Food Insecurity Rates Greater than 4 Percentage Points from 2009 to 2010

	Food Insecurity Rate 2010 (%)	Food Insecurity Rate 2009 (%)
Winston County, Alabama	18.8	23.0
Greenlee County, Arizona	16.1	23.4
Elkhart County, Indiana	16.8	21.5
Hillsdale County, Michigan	16.6	20.7
Sargent County, North Dakota	6.8	12.1
Cameron County, Pennsylvania	16.4	20.5
Decatur County, Tennessee	17.5	21.6
Jackson County, Tennessee	17.0	21.2
Monroe County, Tennessee	18.0	22.2
Perry County, Tennessee	20.9	28.3
Pickett County, Tennessee	17.8	22.0
Duval County, Texas	17.8	22.8
Kenedy County, Texas	13.1	25.1
Presidio County, Texas	22.3	27.0
Starr County, Texas	25.3	29.6
Willacy County, Texas	23.8	28.4
Zapata County, Texas	20.9	25.7
Greene County, Alabama	*32.2*	*28.1*
Clay County, Georgia	*27.4*	*23.3*
Hancock County, Georgia	*35.9*	*30.4*
Quitman County, Georgia	*27.4*	*21.7*
Tensas Parish, Louisiana	*26.8*	*22.5*

Note: The counties in normal text had declines in food insecurity rates. The counties in italics had increases in food insecurity rates.

Table 5: Counties with Changes in Child Food Insecurity Rates Greater than 6 Percentage Points from 2009 to 2010

	Child Food Insecurity Rate 2010 (%)	Child Food Insecurity Rate 2009 (%)
Coosa County, Alabama	23.9	30.8
Marion County, Alabama	32.1	38.4
Winston County, Alabama	34.6	42.2
Wade Hampton Census Area, Alaska	37.5	43.6
Greenlee County, Arizona	27	37.2
Marion County, Arkansas	28.4	36.6
Bent County, Colorado	24.9	31.2
Chattooga County, Georgia	31.2	37.4
Gilmer County, Georgia	31.5	37.7
Irwin County, Georgia	32.3	38.8
Jenkins County, Georgia	32.5	38.6
Lamar County, Georgia	28.3	35.6
McDuffie County, Georgia	25.2	31.5
Marion County, Georgia	29.9	39.5
Richland County, Illinois	20.9	27.1
Adams County, Indiana	25.9	32.4
Crawford County, Indiana	25.6	31.9
Elkhart County, Indiana	25.8	33.2
Fayette County, Indiana	28.2	34.6
Fulton County, Indiana	22.5	28.7
Noble County, Indiana	25	31.4
Parke County, Indiana	24.9	31.1
Steuben County, Indiana	23.3	29.8
Gallatin County, Kentucky	28.8	35.6
Lawrence County, Kentucky	28.4	35.7
Lyon County, Kentucky	23.4	31
Magoffin County, Kentucky	34.5	40.6
Martin County, Kentucky	30.7	36.8
Nicholas County, Kentucky	22.7	33
Rockcastle County, Kentucky	26.1	33.9
Trigg County, Kentucky	21.7	29.3
Washington County, Kentucky	19.8	28.1
Baraga County, Michigan	31.5	38
Gladwin County, Michigan	29.7	35.9
Hillsdale County, Michigan	26.2	32.8
Lake County, Michigan	26.1	32.4
Lake of the Woods County, Minnesota	19.9	27
Gasconade County, Missouri	22.5	28.6

Scotland County, Missouri	24.8	31.7
Shannon County, Missouri	31.2	38.6
Phillips County, Montana	19.2	26
Wheatland County, Montana	16.1	28.4
Esmeralda County, Nevada	20.1	26.9
Alleghany County, North Carolina	33.1	39.6
Sargent County, North Dakota	9.3	18.5
Sheridan County, North Dakota	16.6	23.2
Wells County, North Dakota	9.9	20.6
Williams County, Ohio	27.2	33.3
Wheeler County, Oregon	24.3	30.4
Cameron County, Pennsylvania	26.3	33.7
Abbeville County, South Carolina	27.7	34.1
Bledsoe County, Tennessee	31.9	39.6
Campbell County, Tennessee	29.2	35.3
Clay County, Tennessee	25.3	32.3
Decatur County, Tennessee	29.2	40.3
Fentress County, Tennessee	30	36.8
Greene County, Tennessee	29.3	36
Hancock County, Tennessee	34.1	41.8
Hawkins County, Tennessee	26.1	32.2
Henderson County, Tennessee	28.4	35
Houston County, Tennessee	26.4	34.1
Jackson County, Tennessee	28.9	36.5
Lauderdale County, Tennessee	29.1	35.8
Lewis County, Tennessee	30	38
McNairy County, Tennessee	27.8	34.1
Marshall County, Tennessee	30.9	37.6
Monroe County, Tennessee	29	35.8
Morgan County, Tennessee	27.5	33.7
Overton County, Tennessee	26.4	32.7
Perry County, Tennessee	36.5	48.3
Pickett County, Tennessee	27.6	34
Sequatchie County, Tennessee	29.3	36
Smith County, Tennessee	25.8	32.8
Trousdale County, Tennessee	20.6	26.7
White County, Tennessee	28.8	35.5
Briscoe County, Texas	26.4	32.5
Childress County, Texas	23.7	31.7
Crane County, Texas	28.1	35.4
Culberson County, Texas	26.9	34.5
Duval County, Texas	33.5	40
Kenedy County, Texas	24	42.5

La Salle County, Texas	28.4	35.2
Loving County, Texas	0	29.8
McMullen County, Texas	21.7	28.6
Morris County, Texas	28.4	34.6
Motley County, Texas	27.5	34.2
Presidio County, Texas	36.2	44.4
Schleicher County, Texas	24.3	31.9
Willacy County, Texas	41.5	49.3
Winkler County, Texas	25.7	33.8
Highland County, Virginia	17.9	24.4
Scott County, Virginia	22.3	28.9
Bedford city, Virginia	23.1	29.9
Norton city, Virginia	20.7	28.4
Loup County, Nebraska	*30.5*	*23.6*
Quitman County, Georgia	*30.9*	*24.5*

Note: The counties in normal text had declines in food insecurity rates. The counties in italics had increases in food insecurity rates.

References

Coleman-Jensen A., M. Nord, M. Andrews, and S. Carlson. *Household Food Security in the United States in 2010*, Economic Research Report ERR-125. Washington D.C.: U.S. Department of Agriculture, Economic Research Service. 2011.

Feeding America. *Map the Meal Gap: Preliminary Findings 2011*. 2011a.

Feeding America. *Map the Meal Gap: Child Food Insecurity 2011*. 2011b.

Gundersen, C., B. Kreider, and J. Pepper. "The Economics of Food Insecurity in the United States." *Applied Economic Perspectives and Policy*, v33(3), 281-303. 2011a.

Gundersen C., J. Brown, E. Engelhard, and E. Waxman. *Map the Meal Gap: Technical Brief*. 2011b.

Gundersen C., J. Brown, E. Engelhard, and E. Waxman. *Map the Meal Gap: Child Food Insecurity 2011: Technical Brief*. 2011c.