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**A DECADE OF CHANGE: MEASURING THE EXTENT,  
DEPTH AND SEVERITY OF FOOD INSECURITY**

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## ABSTRACT

Rates of food insecurity in the U.S. have been rising since 2000 spiking with the onset of the Great Recession in 2008, and have remained essentially unchanged since then. Largely ignored are examinations of the depth and severity of food insecurity as well as a more thorough descriptive examination of the racial and ethnic patterns of food insecurity among low-income populations. Food security is typically measured with a dichotomous indicator which fails to capture the full range of information available included in the Current Population Survey (CPS) Food Security Supplement (FSS). This study employs a series of measures adapted from the literature on poverty to examine the depth and severity of food insecurity across the decade by race and ethnicity among low-income households with and without children. Using multiple years of the FSS (2001-2003 N=95,147 households; 2006-2008 N= 83,771 households; 2013 N= 84,861 households) this study finds that while prevalence of food insecurity is higher among low-income households with children throughout the time period, the most rapid increases in the prevalence, depth and severity of food insecurity are found among low-income households without children. Non-Hispanic black households with and without children are at the most disadvantaged among low-income populations. Non-Hispanic white households with and without children have lower prevalence rates but steeper increases in the depth and severity of food insecurity throughout the decade.

## BACKGROUND

Food insecurity—the lack of consistent access to adequate amounts of food—remains a reality of many American families. For example, 14 percent of all households and 20 percent of U.S. households with children experienced low food security during 2013 (Coleman-Jensen, Gregory and Singh 2014). Furthermore, over 6.8 million households in the U.S. experienced very low food security; a more severe condition characterized by a reduction in food intake and a disruption of normal eating patterns due to a lack of resources or income needed to obtain sufficient food (Coleman-Jensen et al. 2014). This is not a recent phenomenon, the rates of food insecurity in the U.S. have been rising since 2000 spiking with the onset of the Great Recession in 2008, and have remained essentially unchanged since then.

Food insecurity has been related to lower levels of general physical health among adults (Stuff, Casey, Szeto, et al. 2004) and health related quality of life (Casey, Szeto, Lensing et al.. 2005) as well as a variety of poor health outcomes such as diabetes and hypertension (Seligman, Laraia and Kushel 2010; Vozoris and Tarasuk 2003). There have also been many studies linking food insecurity to poor health outcomes among children including lower-parent reported health status (Ryu, Hee and Bartfeld 2012) anemia (Eicher-Miller, Mason, Weaver et al.. 2009; Skalicky et al.. 2006; Alaimo et al. 2001) and asthma (Kirpatrick et al.. 2010). Food insecurity among children has also been associated with delayed academic and cognitive development (Winicki & Jemison 2003; Alaimo, et al.. 2001; Howard 2011; Cook & Frank 2008; Jyoti et al. 2005; Rose-Jacobs et al.. 2008; Dunifon and Kowaleski-Jones 2003), higher probabilities of anxiety and aggression (Whitaker et al., 2006; Slopen, Fitzmaurice, Williams and Gilman 2010), as well as increased behavioral problems (Slack and Yoo 2005; Huang, Matta Oshima and Kim 2010; Slopen et al.. 2010). The current sustained high level of food insecurity in the U.S. has the potential to

cause long term consequences for child and adult well-being.

Much of the research on possible causes of household food insecurity has focused on economic correlates (e.g., job loss, unstable income), with many studies focusing on the ameliorative effects of food programs (e.g., SNAP, school breakfast and lunch programs, food pantries) or on family characteristics (e.g., family disruption, disability). Largely ignored are examinations of the depth and severity of food insecurity (Gundersen 2008) as well as a more thorough descriptive examination of the racial and ethnic patterns of food insecurity. It may be that while the prevalence of household food insecurity overall has remained high and relatively unchanged during recent years, different populations may be experiencing shifts in the prevalence and depth of this burden.

## OBJECTIVE

The contributions of this study are twofold. First, a series of measures drawn from the poverty literature are presented that reflect the prevalence, depth and severity of food insecurity among low-income US households over the last decade. In studies on poverty, prevalence rates are measured (i.e., how many households have incomes below a set poverty threshold) but also measured are the depth and severity of poverty (i.e. how far below the poverty line do households fall). It is this approach that is adopted here. Second, multiple indices of food insecurity are presented for the three largest racial and ethnic groups in the U.S.; non-Hispanic whites, non-Hispanic blacks, and Hispanics. As with other forms of disadvantage, food insecurity is overrepresented among racial and ethnic minority groups (Ribar and Hamrick 2003; Bartfeld et al. 2006).

## METHODS

*Data.* The data used in this analysis came from multiple years of the Current Population Survey (CPS) Food Security Supplement (FSS), sponsored by the USDA's Economic Research Service. During the month of December participating households complete the Food Security Survey Module. The survey asks one adult respondent in each household a series of questions about experiences and behaviors of household members that indicate food security, such as being able to afford balanced meals, cutting the size of meals or being hungry because of money shortages. Due to the potential for households in adjacent years of the FSS to be surveyed twice, households surveyed in the fifth through eighth months of 2011 and 2012 are combined with all households in 2013 (N= 84,861 households). The same methods are used for data from 2001-2003 (N=95,147 households) and 2006-2008 (N= 83,771 households). The data are weighted using a standardized household supplement weight, which maintains the original sample size but weights the data to be representative of the U.S. population.

### *Food Security Measurement.*

The household food security scale was developed by the USDA to measure the severity of food insecurity experienced in the household in the previous 12 months. It is measured with an 18-item scale if the household contains children and 10 if it does not. The questions range from "We worried whether our food would run out before we got money to buy more," to "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?" Responses to the questions are used to create an interval-level measure based on the Rasch measurement model. The underlying assumption of the Rasch model is that the probability that a household answers "yes" to a question relative to answering "no" depends on the degree and extent of latent food insecurity. The values in the scale provide a meaningful indication of the level

of food insecurity of households (Bickel et al., 2000). Using this methodology, the scale scores range from 0 (no affirmative responses) to 13.03 (18 affirmative responses) for households with children and 11.05 for households without children.

Most often a simple dichotomous indicator of whether or not a household has food insecurity (also known as low food security) is used for analysis, which is indicated by an affirmative response to at least three of the 18-items in the overall scale (USDA). Households may be further classified as having *very low food security* (reporting six or more affirmative answers for households without children; eight or more for households with children). However, by classifying households into these categories, much of the information contained in the multiple questions is lost that might help uncover racial and ethnic variation in household experiences with food insecurity (Gundersen 2008). For example, consider one household responding affirmatively to 5 questions and another responding affirmatively to 10—they both are classified as having very low food security but differ greatly in the degree of deprivation. To take advantage of the full range of information contained in the 18 questions this study follows methodology developed by Dutta and Gundersen (2007) and Gundersen (2008) which adapts the set of poverty indices established by Foster-Greer-Thornbeck (FGT) (1984). Below is a general discussion of the methodology used to create the FGT-based indices.

### *Food Insecurity Indices*

Using the information from the food security questionnaire, the normalized Food Insecurity Index (FII) can be created which captures the degree to which the household is food insecure. For all households  $n$ , let  $s_i$  indicate the latent value of food insecurity for household  $i$  where  $s_i$  lies in the interval  $[0, z]$  such that the value of 0 implies the absence of any insecurities with respect to food and  $z$  denotes the most insecurities with respect to food. The value of  $z$  varies by households'

composition (i.e., households with children vs. households without children). A household is considered food insecure if  $s_i > e$  where  $e$  is the threshold or cut point for food insecurity. Gundersen (2008) considers  $e$  similar to a poverty threshold and suggests that for every household  $i$ , the food insecurity index (FII) for household  $i$  may be defined to be 0 if  $s_i < e$  and  $(s_i > e)$  if  $s_i > e$ . The FII represents the degree to which a household is food insecure, that is, how far the household falls from being food secure. The normalized food insecurity index represents an aggregation of food security levels for all households:

$$d_i = \frac{s_i - e}{z - e} \text{ if } s_i > e; d_i = 0 \text{ otherwise}$$

Where  $d$  denotes the degree of food insecurity suffered by all households  $N$  assuming that  $d$  is a function of  $d_1, \dots, d_n$ . [For more detailed methodology see Dutta and Gundersen (2007) or Gundersen (2008)].

In this study,  $s_i$  is obtained from the Rasch scoring method and  $z$  is set equal to 13.03 for households with children, and 11.05 for households without children. The USDA considers households as food insecure if they respond affirmatively to three or more questions. This cut point or threshold corresponds to a value of  $e = 2.56$  for households with children, and  $e = 3.10$  for households without children. The corresponding values for very low food security are  $e = 6.02$  for households with children, and  $e = 6.16$  for households without children. Prior to 2006, the USDA described households with low food security as ‘food insecure without hunger’ and households with very low food security as ‘food insecure with hunger’. Changes were made in the descriptions to ‘low food security’ and ‘very low food security’ but the criteria by which the households were classified remained unchanged (Coleman-Jensen 2014).

In the poverty literature, the FGT formula is used to measure how income is distributed

around a poverty line or threshold. A key advantage of this type of measure is that it describes how many poor are falling far below the poverty line and how many are hovering near it. By adopting the FGT class of measures to examine food insecurity, three Food Insecurity indices are created based on the following:

$$d^\alpha = \frac{\sum_{i=1}^n (d_i)^\alpha}{n}$$

When  $\alpha = 0$ ,  $d$  defines the food insecurity rate, or the proportion of households that are food insecure. When  $\alpha = 1$  the resulting measure is considered the food security gap which can be thought of revealing the depth of food insecurity. When  $\alpha = 2$ , the measure is considered the squared food security gap and may be thought of as reflecting the severity of food insecurity.

*Analysis.* Measures of food insecurity are not person specific. That is, they refer to all members of the household; therefore, a household level analysis is performed. The analysis is limited to all low-income households, which are defined as those with incomes that place them below 185% of the federal poverty line. This translates into an annual income of roughly \$42,600 for a family of four in 2012. The majority of food insecure households are low income—only 6.8% of households with income at or over 185% of the poverty line were considered food insecure in 2012, compared with 34.3% of households below that mark.

The analysis proceeds as follows: first, the three food insecurity indices are presented as described above for three time periods 2001-03, 2006-08, and 2011-13 for all low-income households both with and without children. The percentage change in food security indices over the decade for each group is presented. Next, the three indices are presented for each time period for the sample of households headed by non-Hispanic whites and non-Hispanic blacks (hereafter



referred to as whites and blacks) and Hispanics for households with children (ages 0 to 17) and households without children. And finally, the analyses are repeated by moving the threshold of food insecurity to the more severe form of very low food security.

## RESULTS

### *Patterns of food insecurity and very low food security.*

Table 1 presents the three food insecurity indices for the combined years of the CPS-FSS starting with 2001-2003 and ending with 2011-2013 for households with children (Panel A) and households without children (Panel B). The prevalence of food insecurity among low-income households with children remained fairly steady rising from roughly 35% in 2001-03 to 38% ten years later. Households without children experienced a steeper increase in the prevalence of food insecurity increasing from nearly 20% to 28%.

Whereas the prevalence measure gives an indication of how many households are food insecure, the measure representing the depth of food insecurity—the food security gap ( $\alpha=1$ )—describes the average percentage by which low-income households falls below the food security threshold. That is an important distinction because the prevalence measure may be misleading. For example, the prevalence measure does not register if households are becoming more food insecure – the overall prevalence of food security does not change when a food insecure household becomes even more at risk. For low-income households with children, this measure has increased almost 16% during the decade, more rapidly than has the rate of prevalence increase at 8%. The most rapid increase across the three indices occurs for the measure that is most sensitive to the distribution of the food insecure population. This measure – the squared food security gap ( $\alpha=2$ )—increased by 23% for households with children during the roughly ten years examined.

[Table 1 Here]

While the prevalence of food insecurity is higher among low-income households with children throughout the time period, the most rapid increases in the prevalence, depth and severity of food insecurity are found among low-income households without children. The bottom panel of Table 1 presents estimates for households that contain no children ages 0 to 17. The prevalence of food insecurity among low-income households with no children increased by 43% during the time period under study. The most recent estimate suggests that 28% of low-income households with no children present are food insecure. The food security gap rose from 8.2 in 2001-03 to 12.6 in 2011-13. The measure of severity of food insecurity also increased rapidly, almost doubling from 4.9 in 2001-03 to 7.7 in 2011-13. From ( $\alpha=1$ ) it is clear that on average, the food insecure are become more insecure and ( $\alpha=2$ ) indicates that severity is increasing particularly for households without children.

[Table 2 here]

Table 2 provides similar information for all low-income households except that the threshold indicating food insecurity is set at a more extreme level of very low food security. The prevalence measure ( $\alpha=0$ ) reveals that the rate of growth in very low food security among households with children (35%) has been much greater than the change in low food security (8%). The additional information gained from this analysis shows that while the prevalence of food insecurity has increased, the food insecure have become even worse off. The patterns are similar for households without children (Panel B, Table 2). For both the low food secure and the very low food secure, not only is their number growing, but they are becoming more food insecure on average and are experiencing an increase in the depth and severity of food insecurity.

*Patterns of food insecurity by race/ethnicity.*

Analyzing the FGT-based indices of food insecurity by race/ethnicity provides an example of how the distribution-sensitive measures can help to gain a better understanding of the demographic nature of the burden of food insecurity. Tables 3 and 4 provide similar information as Table 1, except that the samples are disaggregated by the race/ethnicity of the household head. Among low-income households with children, those headed by whites or Hispanics have consistently lower rates of food insecurity across the decade than households headed by non-Hispanic blacks (Table 3). The most recent estimates (2011-2013) show that roughly 36% of low-income white and Hispanic households with children experienced food insecurity compared with 43% of black households.

There are some interesting patterns of change in food insecurity levels that occurred during the last decade. First, black households with children consistently have the highest prevalence rate among low-income households changing very little over the decade (3%). They also exhibit the most depth ( $\alpha=1$ ) and severity ( $\alpha=2$ ) of food insecurity across all time points. Second, little change was observed in the prevalence of food insecurity among Hispanic low-income households with children, but among those with food insecurity the depth and severity did increase 5% and 12%, respectively. And finally, while low-income households with children headed by whites generally have the lowest prevalence of food insecurity throughout the time period under study, they have also witnessed the most rapid increase in all three indices. For example, the prevalence of food insecurity increased roughly 19%, the food insecurity gap by 31% and the squared food insecurity gap increased 43% during the decade.

Table 4 presents the same analysis for low-income households with no children present. Again, even among low-income households whites have a protective advantage against food insecurity. The most recent estimates suggest that whereas roughly a quarter of low-income white

households with no children suffer from food insecurity, 39% of black and 30% of Hispanic households do. Even though the incidence of food insecurity is lower for low-income households without children compared to households with children, the percentage change in the last decade is higher. There has been a 53% increase in the prevalence of food insecurity among low-income white households and a 22% increase among Hispanic and Black households without children in the last decade. The most rapid increase among the three indicators occurs for the measure of the severity of food insecurity ( $\alpha=2$ ). This measure takes into account not only the distance from food insecurity threshold (as does  $\alpha=1$ ) but also the inequality among the food insecure. That is, a higher weight is placed on those households that score worse on the food security scale. This measure increased by roughly 68% during the decade for white households without children, 40% for black households, and 31% for Hispanics. It is clear from  $\alpha=1$  that on average, food insecure households have become more insecure over the decade and that those who are the most insecure are feeling the brunt of the increase. Overall, the depth and severity of food security is the most pronounced for low-income black households with no children suggesting increased disadvantage and perhaps an additional lack of resources that may serve as a protection against food insecurity.

Table 5 presents a similar analysis when the food security threshold is moved to the more severe cut point of very low food security. Here there are fewer race and ethnic differences within time period for low-income households with children (Panel A), but the general trend is one of increasing prevalence of very low food security for all groups. The rate of growth in very low food security for whites, blacks and Hispanics has been much greater than the respective changes in low food security (Table 2) for each group across the decade. The prevalence for very low food security is the highest for white and black low-income households with children in the last two time periods, closely followed by Hispanics. An examination of low-income households without

children (Panel B) shows that the prevalence of the more severe form of food insecurity is highest for black households, but the increase over the decade is greater for white and Hispanic households. The depth ( $\alpha=1$ ) and severity ( $\alpha=2$ ) of very low food security reveals that black households without children are faring much worse over time than either white or Hispanic households.

## CONCLUSION

Food insecurity remains an issue for many American families, even as the economy has improved since the Great Recession (Coleman-Jensen and Gregory 2014). During the last decade, the rate of food insecurity has remained between 10 and 12 percent for all households, and 35 to 38 percent for low-income households. By considering measures of food insecurity that are sensitive to changes in the distribution of food insecurity, this study found that growth of food insecurity appears to be greater than sustained prevalence rates over the last decade indicate.

As a sole guide to allocating resources, the prevalence measure of food insecurity may be misleading. The prevalence measure does not register if food insecure households are becoming less food secure—the prevalence of food security does not change when a food insecure household becomes even worse off. By incorporating the food insecurity gap, or the amount by which households have dropped below the threshold, the results of this study suggest that while there has been a relatively small increase over the course of the decade, there have been large shifts in the depth and severity.

While this study is descriptive, it is an important addition toward obtaining an accurate representation of the extent, depth and severity of food insecurity across time, and across race and ethnic subpopulations. The findings here show that low-income black households, both with and

without children, are at a particular sustained disadvantage that is growing worse. Among all low-income households, those headed by whites are at an advantage with respect to food security, but they also have experienced steep increases in the prevalence, depth and severity of food insecurity in the last decade.

The results here also point to an increasing severity of food insecurity among households without children. While the prevalence of food insecurity is higher among low-income households with children throughout the time period, the most rapid increases in the prevalence, depth and severity of food insecurity are found among low-income households without children. This is important to recognize as there are an estimated one million childless adults expected to lose access in 2016 to the Supplemental Nutrition Assistance Program (SNAP), the key program for alleviating food insecurity in the United States, as many states are facing a return to a three-month limit on benefits (Bolen 2015).

## REFERENCES

- Alaimo K., Olson, C., & Frongillo, E. (2001). Food insufficiency and American school-aged children's cognitive, academic, and psychosocial development. *Pediatrics*, 108(1), 44-53.
- Bartfeld, J. and Dunifon, R. (2006). State-level predictors of food insecurity among households with children. *Journal of Policy Analysis and Management*. 25(4): 921-942.
- Bolen, E. (2015). Approximately 1 million unemployed childless adults will lose SNAP benefits in 2016 as state waivers expire. Center for Budget and Policy Priorities January 5, 2015.
- Casey, P. H., Szeto, K., Robbins, J. M., Stuff, J. E., Connell, C., Gossett, J., & Simpson, P. M. (2005). Child health-related quality of life and household food security. *Archives of Pediatric and Adolescent Medicine*, 159, 51-56.
- Coleman-Jensen, A, Gregory C, and Singh, A. (2014). Household Food Security in the United States in 2013, ERR-173, U.S. Department of Agriculture, Economic Research Service.
- Cook, J, and Frank D. (2008). "Food Security, Poverty, and Human Development in the United States." *Annals of the New York Academy of Sciences* 1136: 193-209.
- Dunifon R, Kowaleski-Jones L. (2003). The influences of participation in the National School Lunch Program and food insecurity on child well-being. *Soc Serv Rev*. 77(1):72-92.
- Dutta, I and Gundersen, C. (2007). Measures of Food Insecurity at the Household Level. In *Food Security Indicators, Measurement, and the Impact of Trade Openness: Series: WIDER Studies in Development Economics*, ed. Basudeb Guha-Khasnobis, Shabd S. Acharya, Benjamin Davis, 42-61. Oxford: Oxford University Press.
- Eicher-Miller HA, Mason AC, Weaver CM, McCabe GP, Boushey CJ. (2009). Food insecurity is associated with iron deficiency anemia in US adolescents. *Am J Clin Nutr*.;90:1358-1371
- Foster, J., Greer, J., and Thorbecke, E. (1984). A class of decomposable poverty measures. *Econometrica* 52(3): 761-766.
- Gundersen, C. (2008). Measuring the Extent, Depth, and Severity of Food Insecurity: An Application to American Indians in the USA. *Journal of Population Economics*, 21(1): 191-215.
- Howard, L.(2011). Does food insecurity at home affect non-cognitive performance at school? A longitudinal analysis of elementary student classroom behavior. *Economic of Education Review*. 30(1): 157-176.

- Huang, J., Oshima, K., Kim, Y., (2010). Does household food insecurity affect parenting and children's behaviors? Evidence from the Panel Study of Income Dynamics (PSID). *Social Service Review*, 84(3),381-401.
- Jyoti, D. F., Frongillo, E. A., & Jones, S. (2005). Food insecurity affects school children's academic performance, weight gain, and social skills. *Journal of Nutrition*,135, 2831.
- Kirkpatrick, S., L. McIntyre, and M. Potestio. (2010). Child Hunger and Long-term Adverse Consequences for Health. *Archives of Pediatrics and Adolescent Medicine*. 164 (8): 754 – 762.
- Ribar, DC. And Hamrick, KS. Dynamics of poverty and food sufficiency. (2003). *Food Assistance and Nutrition Research Report*. Number 36.
- Rose, D, Gundersen, C, and Oliveira, V. (1998). Socio-Economic Determinants of Food Insecurity in the United States: Evidence from the SIPP and CSFII Datasets. Food and Rural Economics Division, Economic Research Service, US Department of Agriculture. Technical Bulletin No. 1869.
- Rose-Jacobs, R., Black, M. M., Casey P. H., et al. (2008). Household food insecurity: Associations with at-risk infant and toddler development. *Pediatrics*, 121(1), 65-72.
- Ryu, JH and Bartfeld, JS. (2012). Household Food Insecurity During Childhood and Subsequent Health Status: The Early Childhood Longitudinal Study–Kindergarten Cohort, *American Journal of Public Health* 102(11):e50-e55.
- Seligman, H. K., Laraia, B. A., & Kushel, M. B. (2010). Food Insecurity Is Associated with Chronic Disease among Low-Income NHANES Participants. *The Journal of Nutrition*, 140(2), 304–310. doi:10.3945/jn.109.112573
- Skalicky, A., Meyers, A., Adams, W. G., Yang, .Z, Cook, J. T., & Frank, D. A. (2006). Child food insecurity and iron deficiency anemia in low-income infants and toddlers in the United States. *Maternal and Child Health Journal*, 10 (2).
- Slack K, Yoo J (2005) Food hardship and child behavior problems among low-income children. *Soc Serv Rev* 79(3):511–536.
- Slopen, N.,Fitzmaurice, G., Williams, D. R., Gilman, S.E. (2010) Poverty, food insecurity and the risk for childhood internalizing and externalizing disorders. *Journal of the American Academy of Child and Adolescent Psychiatry*, 49(5), 444-452.
- Stuff, JE, Casey, PH, Szeto KL, Gossett, JM, Simpson, PM, Connell, C and Bogle ML. 2004 Household food insecurity is associated with adult health status. *J.Nutr.* 134(9): 2330-2335.
- Vozoris NT, Tarasuk VS. Household food insufficiency is associated with poorer health. *J Nutr.* 2003;133:120–6



Whitaker, R., S. Phillips, and S. Orzol. 2006. Food Insecurity and the Risks of Depression and Anxiety in Mothers and Behavior Problems in their Preschool-Aged Children. *Pediatrics* 118: e859–e868.

Winicki, J. & Jemison, K. (2003). Food insecurity and hunger in the kindergarten classroom: Its effect on learning and growth. *Contemporary Economic Policy, Western Economic Association International*, 21(2), 145-157

**TABLE 1 Indices of food insecurity by household type, 2001/3, 2006/8 and 2011/13.**

|          |  | Low Income Households (185% FPL) |                |                |   |     |
|----------|--|----------------------------------|----------------|----------------|---|-----|
|          |  | 2001-<br>2003                    | 2006-<br>2008  | 2011-<br>2013  | Percentage<br>Change 2001/3<br>to 2011/13 |     |
| <b>A</b> | <b>Households with Children</b>            |                                  |                |                |   |     |
|          | Food Insecurity Rate ( $\alpha=0$ )        | <i>Prevalence</i>                | 34.6<br>(0.56) | 36.0<br>(0.56) | 37.5<br>(0.66)                            | 8%  |
|          | Food insecurity gap ( $\alpha=1$ )         | <i>Depth</i>                     | 9.4<br>(0.56)  | 10.6<br>(0.21) | 10.9<br>(0.22)                            | 16% |
|          | Squared food insecurity gap ( $\alpha=2$ ) | <i>Severity</i>                  | 3.5<br>(0.56)  | 4.3<br>(0.12)  | 4.3<br>(0.12)                             | 23% |
| <b>B</b> | <b>Households without Children</b>         |                                  |                |                |   |     |
|          | Food Insecurity Rate ( $\alpha=0$ )        | <i>Prevalence</i>                | 19.6<br>(0.56) | 23.3<br>(0.41) | 27.9<br>(0.46)                            | 43% |
|          | Food insecurity gap ( $\alpha=1$ )         | <i>Depth</i>                     | 8.2<br>(0.56)  | 10.6<br>(0.23) | 12.6<br>(0.25)                            | 53% |
|          | Squared food insecurity gap ( $\alpha=2$ ) | <i>Severity</i>                  | 4.9<br>(0.56)  | 6.4<br>(0.18)  | 7.7<br>(0.19)                             | 57% |

Indices are multiplied by 100 and estimated with household supplement weights. Standard errors are in parentheses and multiplied by 100.

**TABLE 2 Indices of very low food security by household type, 2001/3, 2006/8 and 2011/13.**

|          |  | Low Income Households (185% FPL) |                |                 |   |     |
|----------|--|----------------------------------|----------------|-----------------|---|-----|
|          |  | 2001-<br>2003                    | 2006-<br>2008  | 2011-<br>2013   | Percentage<br>Change 2001/3<br>to 2011/13 |     |
| <b>A</b> | <b>Households with Children</b>            |                                  |                |                 |   |     |
|          | Food Insecurity Rate ( $\alpha=0$ )        | <i>Prevalence</i>                | 8.97<br>(0.33) | 11.89<br>(0.39) | 12.07<br>(0.37)                           | 35% |
|          | Food insecurity gap ( $\alpha=1$ )         | <i>Depth</i>                     | 2.32<br>(0.10) | 3.16<br>(0.13)  | 3.18<br>(0.13)                            | 37% |
|          | Squared food insecurity gap ( $\alpha=2$ ) | <i>Severity</i>                  | 0.89<br>(0.06) | 1.25<br>(0.08)  | 1.23<br>(0.07)                            | 39% |
| <b>B</b> | <b>Households without Children</b>         |                                  |                |                 |   |     |
|          | Food Insecurity Rate ( $\alpha=0$ )        | <i>Prevalence</i>                | 8.63<br>(0.27) | 11.65<br>(0.32) | 13.76<br>(0.33)                           | 59% |
|          | Food insecurity gap ( $\alpha=1$ )         | <i>Depth</i>                     | 4.14<br>(0.16) | 5.59<br>(0.18)  | 6.62<br>(0.19)                            | 60% |
|          | Squared food insecurity gap ( $\alpha=2$ ) | <i>Severity</i>                  | 2.69<br>(0.13) | 3.58<br>(0.15)  | 4.32<br>(0.16)                            | 60% |

Indices are multiplied by 100 and estimated with household supplement weights. Standard errors are in parentheses and multiplied by 100.

**TABLE 3 Indices of Food Insecurity among Low-Income Households with Children, by Race/ethnicity and year**

| Indices of Food Insecurity                 | 2001-2003          |                    |                            | 2006-2008          |                    |                              | 2011-2013          |                            |                             | Percentage Change 2001/3 to 2011/13 |                    |          |
|--|--------------------|--------------------|----------------------------|--------------------|--------------------|------------------------------|--------------------|----------------------------|-----------------------------|-------------------------------------|--------------------|----------|
|  | Non-Hispanic White | Non-Hispanic Black | Hispanic                   | Non-Hispanic White | Non-Hispanic Black | Hispanic                     | Non-Hispanic White | Non-Hispanic Black         | Hispanic                    | Non-Hispanic White                  | Non-Hispanic Black | Hispanic |
| Food Insecurity Rate ( $\alpha=0$ )        | 30.6<br>(0.70)     | 41.5<br>(1.25)     | 36.7<br>(1.07)             | 33.3<br>(0.77)     | 40.3<br>(1.38)     | 37.3<br>(1.07)               | 36.4<br>(0.83)     | 42.9<br>(1.53)             | 36.9 <sup>a</sup><br>(1.10) | 19%                                 | 3%                 | 0%       |
| Food insecurity gap ( $\alpha=1$ )         | 8.4<br>(0.24)      | 11.4<br>(0.45)     | 9.5<br>(0.35)              | 10.0<br>(0.28)     | 12.1<br>(0.52)     | 10.5 <sup>a</sup><br>(0.40)  | 11.0<br>(0.31)     | 12.6<br>(0.57)             | 10.0<br>(0.37)              | 31%                                 | 10%                | 5%       |
| Squared food insecurity gap ( $\alpha=2$ ) | 3.2<br>(0.12)      | 4.4<br>(0.27)      | 3.4 <sup>a</sup><br>(0.19) | 4.03<br>(0.15)     | 5.0<br>(0.31)      | 4.3 <sup>a,b</sup><br>(0.24) | 4.5<br>(0.18)      | 5.0 <sup>a</sup><br>(0.30) | 3.8<br>(0.21)               | 43%                                 | 13%                | 12%      |

Indices are multiplied by 100 and estimated with household supplement weights. Standard errors are in parentheses and multiplied by 100. All differences between race/ethnic groups within year are statistically significant to at least the  $p < .05$  level unless otherwise indicated.

a. Used if the p value of the difference from non-Hispanic whites does not reach at least .05

b. Used if the p value of the difference from non-Hispanic blacks does not reach at least .05

**TABLE 4 Indices of Food Insecurity among Low-Income Households without Children, by Race/ethnicity and year**

| Indices of Food Insecurity                 | 2001-2003          |                    |                            | 2006-2008          |                    |                             | 2011-2013          |                    |                             | Percentage Change 2001/3 to 2011/13 |                    |          |
|--|--------------------|--------------------|----------------------------|--------------------|--------------------|-----------------------------|--------------------|--------------------|-----------------------------|-------------------------------------|--------------------|----------|
|  | Non-Hispanic White | Non-Hispanic Black | Hispanic                   | Non-Hispanic White | Non-Hispanic Black | Hispanic                    | Non-Hispanic White | Non-Hispanic Black | Hispanic                    | Non-Hispanic White                  | Non-Hispanic Black | Hispanic |
| Food Insecurity Rate ( $\alpha=0$ )        | 16.2<br>(0.40)     | 31.7<br>(1.17)     | 24.6<br>(1.34)             | 19.3<br>(0.45)     | 34.8<br>(1.25)     | 29.6<br>(1.40)              | 24.7<br>(0.49)     | 38.7<br>(1.25)     | 30.0<br>(1.25)              | 53%                                 | 22%                | 22%      |
| Food insecurity gap ( $\alpha=1$ )         | 7.0<br>(0.21)      | 13.2<br>(0.62)     | 9.2<br>(0.68)              | 9.0<br>(0.25)      | 15.7<br>(0.70)     | 12.8 <sup>a</sup><br>(0.76) | 11.5<br>(0.27)     | 17.5<br>(0.69)     | 12.1 <sup>a</sup><br>(0.64) | 63%                                 | 32%                | 31%      |
| Squared food insecurity gap ( $\alpha=2$ ) | 4.2<br>(0.16)      | 7.6<br>(0.49)      | 5.2 <sup>a</sup><br>(0.56) | 5.5<br>(0.19)      | 9.5<br>(0.56)      | 7.8<br>(0.60)               | 7.1<br>(0.22)      | 10.7<br>(0.55)     | 6.8<br>(0.48)               | 68%                                 | 40%                | 31%      |

Indices are multiplied by 100 and estimated with household supplement weights. Standard errors are in parentheses and multiplied by 100. All differences between race/ethnic groups within year are statistically significant to at least the  $p < .05$  level unless otherwise indicated.

a. Used if the p value of the difference from non-Hispanic whites does not reach at least .05

b. Used if the p value of the difference from non-Hispanic blacks does not reach at least .05

**TABLE 5 Indices of Very Low Food Security among Low-Income Households with Children, by Race/ethnicity and year**

| Indices of Food Insecurity                 | 2001-2003          |                             |                              | 2006-2008          |                              |                              | 2011-2013          |                              |                              | Percentage Change 2001/3 to 2011/13 |                    |          |
|--|--------------------|-----------------------------|------------------------------|--------------------|------------------------------|------------------------------|--------------------|------------------------------|------------------------------|-------------------------------------|--------------------|----------|
|  | Non-Hispanic White | Non-Hispanic Black          | Hispanic                     | Non-Hispanic White | Non-Hispanic Black           | Hispanic                     | Non-Hispanic White | Non-Hispanic Black           | Hispanic                     | Non-Hispanic White                  | Non-Hispanic Black | Hispanic |
| <b>A Households with Children</b>          |                    |                             |                              |                    |                              |                              |                    |                              |                              |                                     |                    |          |
| Food Insecurity Rate ( $\alpha=0$ )        | 8.58<br>(0.42)     | 10.78<br>(0.80)             | 8.17 <sup>a</sup><br>(0.61)  | 12.16<br>(0.54)    | 13.40 <sup>a</sup><br>(0.96) | 10.42<br>(0.67)              | 13.19<br>(0.55)    | 13.68 <sup>a</sup><br>(0.98) | 9.59<br>(0.59)               | 53.7%                               | 26.8%              | 17.4%    |
| Food insecurity gap ( $\alpha=1$ )         | 2.07<br>(0.12)     | 3.11<br>(0.28)              | 2.12 <sup>a</sup><br>(0.20)  | 3.00<br>(0.16)     | 3.59 <sup>ab</sup><br>(0.32) | 3.12 <sup>ab</sup><br>(0.26) | 3.36<br>(0.19)     | 3.66 <sup>a</sup><br>(0.31)  | 2.64<br>(0.21)               | 62.4%                               | 17.6%              | 24.5%    |
| Squared food insecurity gap ( $\alpha=2$ ) | 0.71<br>(0.06)     | 1.34<br>(0.19)              | 0.82 <sup>a</sup><br>(0.11)  | 1.05<br>(0.08)     | 1.48<br>(0.20)               | 1.38 <sup>ab</sup><br>(0.16) | 1.27<br>(0.11)     | 1.38 <sup>ab</sup><br>(0.17) | 1.09 <sup>ab</sup><br>(0.14) | 78.9%                               | 2.9%               | 33.3%    |
| <b>B Households without Children</b>       |                    |                             |                              |                    |                              |                              |                    |                              |                              |                                     |                    |          |
| Food Insecurity Rate ( $\alpha=0$ )        | 7.48<br>(0.29)     | 14.21<br>(0.88)             | 8.06 <sup>a</sup><br>(0.86)  | 10.15<br>(0.34)    | 16.63<br>(0.98)              | 13.21<br>(1.04)              | 12.67<br>(0.37)    | 18.80<br>(0.96)              | 12.41 <sup>a</sup><br>(0.88) | 69.3%                               | 32.3%              | 54.0%    |
| Food insecurity gap ( $\alpha=1$ )         | 3.61<br>(0.16)     | 6.41<br>(0.49)              | 4.24 <sup>a</sup><br>(0.56)  | 4.78<br>(0.19)     | 8.09<br>(0.57)               | 6.71 <sup>b</sup><br>(0.61)  | 6.14<br>(0.22)     | 9.23<br>(0.55)               | 5.56 <sup>a</sup><br>(0.48)  | 69.9%                               | 44.0%              | 31.0%    |
| Squared food insecurity gap ( $\alpha=2$ ) | 2.35<br>(0.14)     | 4.01 <sup>b</sup><br>(0.42) | 2.98 <sup>ab</sup><br>(0.49) | 2.99<br>(0.16)     | 5.31<br>(0.48)               | 4.44 <sup>b</sup><br>(0.50)  | 4.04<br>(0.19)     | 6.04<br>(0.46)               | 3.44 <sup>a</sup><br>(0.39)  | 71.7%                               | 50.5%              | 15.2%    |

Indices are multiplied by 100 and estimated with household supplement weights. Standard errors are in parentheses and multiplied by 100. All differences between race/ethnic groups within year are statistically significant to at least the  $p < .05$  level unless otherwise indicated.

a. Used if the p value of the difference from non-Hispanic whites does not reach at least .05

b. Used if the p value of the difference from non-Hispanic blacks does not reach at least .05