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Food Insecurity in Households with Children

Prevalence, Severity, and Household Characteristics

Mark Nord



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A Report from the Economic Research Service

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Food Insecurity in Households with Children

Prevalence, Severity, and Household Characteristics

Mark Nord

Abstract

Eighty-four percent of U.S. households with children were food secure throughout 2007, meaning that they had consistent access to adequate food for active, healthy lives for all household members. Nearly 16 percent of households with children were food insecure sometime during the year, including 8.3 percent in which children were food insecure and 0.8 percent in which one or more children experienced very low food security—the most severe food-insecure condition measured by the U.S. Department of Agriculture. Numerous studies suggest that children in food-insecure households have higher risks of health and development problems than children in otherwise similar food-secure households. This study found that about 85 percent of households with food-insecure children had a working adult, including 70 percent with a full-time worker. Fewer than half of households with food-insecure children included an adult educated past high school. Thus, job opportunities and wage rates for less educated workers are important factors affecting the food security of children. In 2007, Federal food and nutrition assistance programs provided benefits to four out of five low-income, food-insecure households with children.

Keywords: Food Security, food insecurity, hunger, children, SNAP, Supplemental Nutrition Assistance Program, WIC, National School Lunch Program

About the Author

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Summary

Most U.S. households with children have dependable access to adequate food for active, healthy living for both adults and children—they are food secure. However, some households experience periods of food insecurity, including times when children as well as adults are affected. The U.S. Department of Agriculture (USDA) monitors the extent and severity of food insecurity in U.S. households through an annual, nationally representative survey, with special attention to households with children.

What Is the Issue?

Food security is especially important for children because their nutrition affects not only their current health, but also their future health and well-being. Previous studies that used various data sources suggest that children in food-insecure households face elevated risks of health and development problems, compared with children in otherwise similar food-secure households. USDA's domestic food and nutrition assistance programs improve children's food security by providing low-income households with access to healthful food, as well as to nutrition education. Knowledge about the extent of food insecurity in households with children—and the household characteristics associated with food insecurity—contributes to effective operation of these and other programs that support the well-being of children. This report describes the prevalence and severity of food insecurity in households with children as of 2007, the trends since 1999, and characteristics of households affected by food insecurity.

What Did the Study Find?

In 2007, 84.2 percent of households with children were food secure throughout the year, meaning that they had consistent access to enough food for active, healthy lives for all household members. The remaining 15.8 percent of households with children were food insecure at some time during the year. In about half of those households, only adults were food insecure, but in 8.3 percent of households with children, one or more of the children were also food insecure at some time during the year. In 0.8 percent of households with children, one or more of the children experienced the most severe food-insecure condition measured by USDA, very low food security, in which meals were irregular and food intake was below levels considered adequate by caregivers.

Job opportunities and wage rates, along with work supports available to working households (such as earned-income tax credits, child care subsidies, and supplemental nutrition assistance), are likely to be key determinants of children's food security in low-income households. A large majority—about 85 percent—of households with food-insecure children have one or more adults in the labor force, including almost 70 percent with one or more full-time workers. However, fewer than half of households with food-insecure children include an adult with education beyond high school, and only 10 percent include an adult with a 4-year college degree. Thus, employment opportunities and wage levels for less skilled or less educated workers are particularly important factors in the food security of dependent children.

In 2006-07, Federal food and nutrition assistance programs provided benefits to four out of five food-insecure households with children if the household had an income less than 185 percent of the poverty line. Children in about 70 percent of such households received free or reduced-price school meals, about 40 percent of the households received Supplemental Nutrition Assistance Program (SNAP) benefits, and about 20 percent received benefits from the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC). Many households received assistance from two or all three of the programs, although one-third reported receiving only free or reduced-price school meals. Low-income households that did not receive assistance from any of the programs were less likely to be food insecure (11 percent) than those that did receive assistance (19 to 32 percent, depending on the mix of programs). This difference suggests that the primary reason for nonparticipation of eligible households is that they feel they do not need food assistance, rather than factors such as inadequate program outreach.

Food insecurity among children was more likely in households that had left SNAP during the previous year than in those currently receiving benefits. This finding suggests that some households leave the program even though their economic resources are not yet adequate to meet their food needs.

How Was the Study Conducted?

Data for the study came from annual food security surveys sponsored by USDA and conducted by the U.S. Census Bureau as supplements to the monthly Current Population Survey. Respondents to the survey were a representative sampling of the U.S. civilian population and included between 15,000 and 18,000 households with children each year. The food security survey asked one adult respondent in each household a series of questions about experiences and behaviors that indicate food insecurity. The food security status of the household was assessed based on the number of food-insecure conditions reported (such as being unable to afford balanced meals, cutting the size of meals, or being hungry because there was too little money for food). The food security status of children in the household was assessed by responses to a subset of questions about the conditions and experiences of children. Survey respondents also reported whether they had used food and nutrition assistance programs. To provide information on how children's health and development may be affected by food insecurity, peer-reviewed studies on those topics by other researchers were reviewed and summarized.

Introduction

Food security—access at all times to enough food for an active, healthy life—is an important foundation for good nutrition and health. Food security is especially important for children because the nutritional content of their diets affects not only their current health, but also their physical, mental, and social development—and thus their future health and well-being.

The U.S. Department of Agriculture (USDA) provides annual statistics on the food security of U.S. households, including summary statistics on households with children by demographic characteristics and income (Nord et al., 2008). The present report gives further detailed information on the food security of households with children, with a breakdown by additional characteristics such as employment, education of adults, and household use of food and nutrition assistance programs (see box “About the Data”).

USDA spends about \$60 billion annually on domestic food and nutrition assistance programs to ensure access to nutritious, healthful diets for all Americans. Children make up the largest share of the beneficiaries of those programs. About 50 percent of the recipients of the largest program, the Supplemental Nutrition Assistance Program (SNAP, formerly the Food Stamp Program), are children under 18. The second and third largest programs, the National School Lunch Program and the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC), focus primarily on children. Knowledge about the extent of food insecurity in households with children and the characteristics associated with food insecurity contributes to the effective operation of these and other programs that support the well-being of children.

About the Data

Data for this study came from annual food security surveys sponsored by USDA and conducted by the U.S. Census Bureau from 1999 to 2007 as supplements to the monthly Current Population Survey (CPS). The surveys were of representative samples of the U.S. civilian population and included between 15,000 and 18,000 households with children each year. (However, about one-fourth of the sample in the 2007 survey was not used for food security estimates because a proposed wording change tested in those households did not perform adequately.) The survey is conducted both by telephone and in person so that households with no telephone are not underrepresented. The food security survey asked one adult respondent in each household a series of questions about experiences and behaviors that indicate food insecurity. The food security status of the household was assessed based on the number of food-insecure conditions reported (such as being unable to afford balanced meals or being hungry because there was too little money for food). The food security questions are presented in Appendix A. The food security status of children in the household was assessed by responses to a subset of questions about the conditions and experiences of children. Survey respondents also reported whether they had used various food and nutrition assistance programs.

Household characteristics (other than food security and receipt of food and nutrition assistance) were calculated from data collected in the labor force section of the CPS. The core CPS collects data on household composition and household income, along with demographic information for each household member and employment information for all persons ages 15 and older.

Weighting factors were calculated by the U.S. Census Bureau so that, when properly weighted, responses to the food security questions are representative at State and national levels. All statistics in this report were calculated by applying the appropriate weights to responses of the surveyed households to obtain nationally representative prevalence estimates.

Food Security and Insecurity: Concepts and 2007 National Statistics

Food insecurity—the lack of consistent access to adequate food—is an economic and social condition that may result in hunger (a physiological condition) if it is severe or prolonged. USDA differentiates food-insecure households by the severity of food insecurity they have experienced. Food insecurity in households with children is further differentiated by whether it affects only adults or also affects children and by the severity of food insecurity among the children.

In 2007, 84.2 percent of households with children were *food secure* throughout the year (fig. 1). The remaining 6.2 million households (15.8 percent of households with children) were *food insecure* at some time during the year.

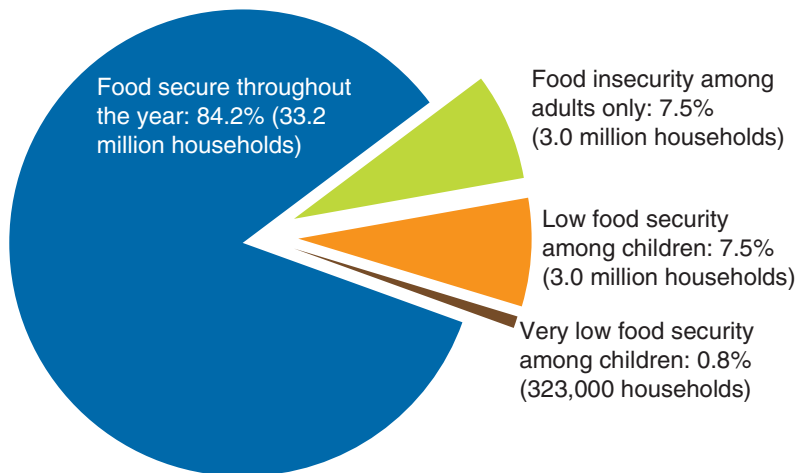
Parents are often able to maintain normal or near-normal diets and meal schedules for their children even when the parents themselves are food insecure. In about half of food-insecure households with children in 2007, only adults were food insecure. However, in about 3.3 million households (8.3 percent of households with children), children, too, were sometimes food insecure. The latter households are referred to in this report as those with *food insecurity among children*.

In about 323,000 households (0.8 percent of households with children), food insecurity among children was so severe that children’s regular meal patterns were disrupted and food intake was reduced to less than the amount that their caregivers considered adequate. These households are described in USDA reports as having *very low food security among children*.

Figure 1

Food security status of households with children, 2007

Either adults or children or both were food insecure at some time during the year in 15.8 percent of households with children. In 8.3 percent, children were food insecure (with either low or very low food security) at some time during the year.



Source: Calculated by Economic Research Service using data from the December 2007 Current Population Survey Food Security Supplement.

Food-Insecure Households With Children: Levels of Food Insecurity

The severity of food access problems in each category of food insecurity can be gauged by the specific conditions reported by households in that category. The food security status of households with children is assessed by adult responses to a series of 18 questions about conditions and behaviors that typically occur in households when they are having difficulty meeting their food needs. (The questions are listed in Appendix A.) Households reporting three or more indications of food insecurity in response to any of the 18 questions are classified as food insecure. In many of these households, only adults are food insecure.

The food security status of children is assessed by responses of an adult in the household to the eight questions about food-related conditions among children (questions 11-18 in Appendix A). Households that report two, three, or four conditions that indicate food insecurity among children are classified as having *low food security among children*.¹ Those reporting five or more conditions are classified as having *very low food security among children*. The more general condition, *food insecurity among children*, includes both categories.

Figure 2 depicts the percentage of households in each food-insecure category that reported each of the eight indicators of food insecurity among children in the 2006 and 2007 food security surveys. (Two years of data were combined to provide more stable and reliable estimates.)

Food Insecurity Among Adults Only

About one-third of households with food insecurity only among adults reported no indications of food insecurity among children. The remaining households in this category—almost two out of three—reported one indicator of food insecurity among children. (Two or more indications are required to classify the household as having food insecurity among children.) The large majority of those reporting one indicator reported the least severe one (i.e., that they had relied on a few kinds of low-cost foods to feed the children because they were running out of money to buy food).

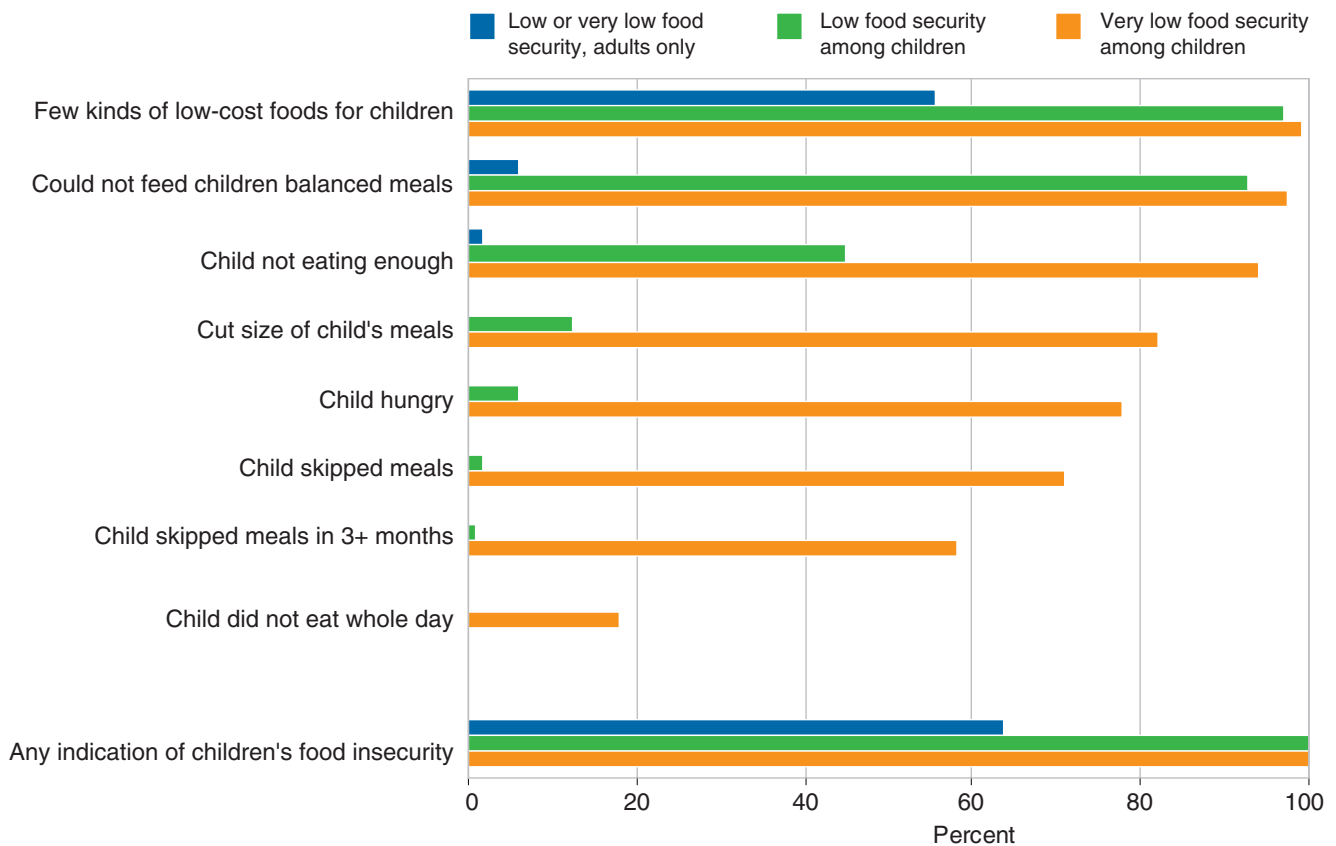
Low Food Security Among Children

Households with low (but not very low) food insecurity among children mainly reported reductions in the quality and variety of children's meals. Only a minority reported any reduction in the amount of food the children ate, and then usually only a single indication of reduced intake.

¹ This specification of the threshold for low food security among children (reports of two or more food-insecure indications) was adopted by USDA to be conceptually consistent with the corresponding threshold for adult/household food insecurity. For the adult and household scales, the threshold for food insecurity corresponds with the severity of not being able to afford balanced meals. For the child scale, the threshold corresponds with the severity of not being able to afford to feed children balanced meals. Low food security among children has been identified in the Current Population Survey Food Security Supplement (CPS-FSS) data, beginning with the December 2006 data, although USDA has not previously published statistics based on the category.

Figure 2

Reported conditions in food-insecure households with children, by food security status, 2006-07 average¹



¹See Appendix A for complete wording of the questions.

Source: Calculated by Economic Research Service using Current Population Survey Food Security Supplement data.

Very Low Food Security Among Children

Households with very low food security among children all reported multiple indications of reduced food intake. Almost 80 percent reported (along with four other indicators of food-insecure conditions among children) that at some time during the year a child had been hungry, but the household just could not afford more food. Those that did not report that a child had been hungry reported either that a child had skipped a meal or not eaten for a whole day because there was not enough money for food.

Food Insecurity and Childhood Hunger

Statistics on food insecurity among children provide important information about the social and economic context in which childhood hunger may occur, but do not directly indicate the extent of hunger. Although hunger is related to food insecurity, it is a different phenomenon. Food insecurity is a household-level economic and social condition of limited access to food, while hunger is an individual-level physiological condition that may result from food insecurity (National Research Council, 2006). Hunger is, thus, a potential—though not inevitable—outcome of food insecurity.

USDA’s nutrition assistance programs are intended, in part, to prevent or alleviate hunger. Specific information about the incidence of hunger would be of considerable interest and might be of value for policy and program design, but collection of precise and useful statistics about hunger is hampered by lack of a consistent meaning of the word and a validated method for measuring it. “Hunger” is understood to refer to conditions across a broad range of severity, from relatively mild food insecurity to “the uneasy or painful sensation caused by lack of food” (one dictionary definition of hunger) to prolonged clinical undernutrition (Nord et al., 2009; National Research Council, 2006).

Authoritative guidance on the definition and concept of hunger in official statistics was provided by the Committee on National Statistics (CNSTAT) of the National Academies in 2006. An independent panel of experts convened by CNSTAT concluded that in official statistics, resource-constrained hunger (i.e., physiological hunger resulting from food insecurity) “...should refer to a potential consequence of food insecurity that, because of prolonged, involuntary lack of food, results in discomfort, illness, weakness, or pain that goes beyond the usual uneasy sensation” (National Research Council, 2006, p. 48).

Validated methods have not yet been developed to measure the prevalence of resource-constrained hunger in this sense. Such measurement would require collection of more detailed and extensive information on physiological experiences of individual household members than is currently available in nationally representative survey data.

Associations Between Children’s Health and Development and Food Insecurity

A substantial, rapidly growing body of research has demonstrated associations between children’s health, development, and well-being and measures of food security and food sufficiency. Food sufficiency—a condition closely related to food security—was assessed in several Federal surveys before the development of the food security measures, and the measure was used in much of the earlier research on outcomes of inadequate food access.² Most of the associations that have been studied are with household-level food insecurity (or food insufficiency), not specifically with food insecurity among children. Causality is difficult to establish in these studies, almost all of which used cross-sectional data. But likely confounding conditions, such as income, age, race, and ethnicity, were generally controlled in the analyses, and the findings are consistent with the hypothesis that food insecurity is a risk factor for the problematic outcomes studied.

Findings of 13 studies on child health and development outcomes associated with food insecurity and food insufficiency are summarized in appendix table B-1. These studies found the following conditions to be more likely for children in food-insecure or food-insufficient households than for children in otherwise similar food-secure households:

- Poorer health of children, as reported by parents
- More stomach aches, frequent headaches, and colds among children
- Higher hospitalization rates of young children
- Iron deficiency anemia in young children
- Behavioral problems in 3-year-olds
- Lower physical function in children ages 3-8
- Poorer psychosocial function and psychosocial development in school-age children
- Higher rates of depressive disorder and suicidal symptoms in adolescents
- More anxiety and depression in school-age children
- Higher numbers of chronic health conditions in children
- More “internalizing” behavior problems in children
- Lower math achievement and other achievement gains in kindergarteners
- Lower math and reading gains from kindergarten to third grade
- Lower arithmetic scores and higher likelihood of repeating a grade for children ages 6-11

Findings with regard to food insecurity and children’s weight status are less clear. Most studies have found weak and inconsistent relationships between food insecurity and being overweight in U.S. children. Furthermore, the few statistically significant findings are not in agreement, and findings differ by

² Prior to the development of the food security measures, the National Health and Nutrition Examination Survey (NHANES) and the Continuing Study of Food Intake by Individuals (CSFII) assessed the adequacy of households’ food access using a single question. Respondents were asked which of three statements best described the food eaten in their household:

- “We always have enough to eat.”
- “Sometimes we don’t have enough to eat.”
- “Often we don’t have enough to eat.”

Households were classified as food sufficient if they reported that they always had enough to eat and food insufficient if they reported that they sometimes or often did not have enough to eat.

age, sex, and race/ethnicity. For example, Bronte-Tinkew et al. (2007) found food insecurity to be positively associated with weight-for-length in children ages 9 to 24 months in the Early Childhood Longitudinal Study-Birth Cohort (ECLS-B), but Rose and Bodor (2006) found the opposite—that kindergarten children in food-insecure households were less likely to be overweight than their food-secure counterparts in the Early Childhood Longitudinal Study-Kindergarten Cohort (ECLS-K). Increases in weight and BMI from kindergarten to third grade were found to be higher for girls (but not boys) in households with marginal food security or food insecurity (Jyoti et al., 2005). However, in the same ECLS-K sample with fifth grade data included, Bhargava et al. (2008) found weak and nonsignificant negative associations between weight gain and food insecurity. Whitaker and Orzol (2006) also found obesity to be negatively associated with food insecurity among preschool-age children in the Fragile Families and Child Well-Being survey, although the association was not statistically significant. More research is needed to understand the reasons for these inconsistencies, but it seems unlikely that any large general associations exist.

Trends in Food Insecurity in Households with Children, 1999-2007

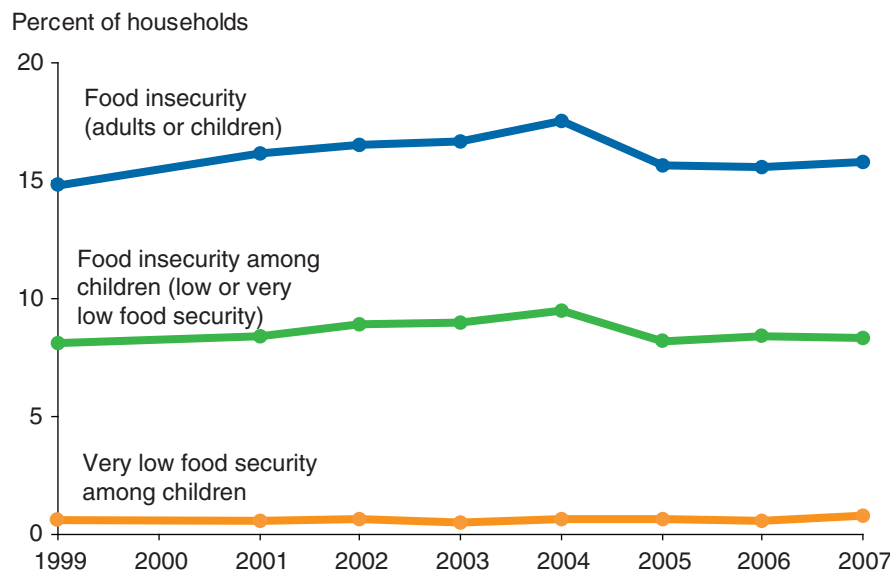
The prevalence of food insecurity in households with children increased beginning with the recession in 2001 (fig. 3).³ It continued to increase in 2002-04 in spite of renewed economic growth and then declined to a level that remained about the same from 2005 to 2007. The pattern for food insecurity among children was essentially identical to the pattern for all household members.

The prevalence of very low food security among children remained essentially unchanged from 1999 to 2006, fluctuating in the range of 0.5 to 0.7 percent. In 2007, this rate increased to 0.8 percent.

USDA gives particular attention to food insecurity in households with children with annual household incomes less than 185 percent of the Federal poverty line.⁴ School-age children in these households are likely to be eligible for free or reduced-price school meals. Most such households are also eligible for benefits from the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC) if they include children under the age of 5 or pregnant women.

Prevalence rates of food insecurity for households with annual incomes less than 185 percent of the Federal poverty line were considerably higher—more than twice as high—as those for all households with children. Trends over the period 1999-2007 in low-income households were generally similar to those in all households with children, although changes were somewhat smaller proportionally (fig. 4).

Figure 3
Trends in food insecurity of households with children, 1999-2007



Source: Calculated by Economic Research Service using Current Population Survey Food Security Supplement data.

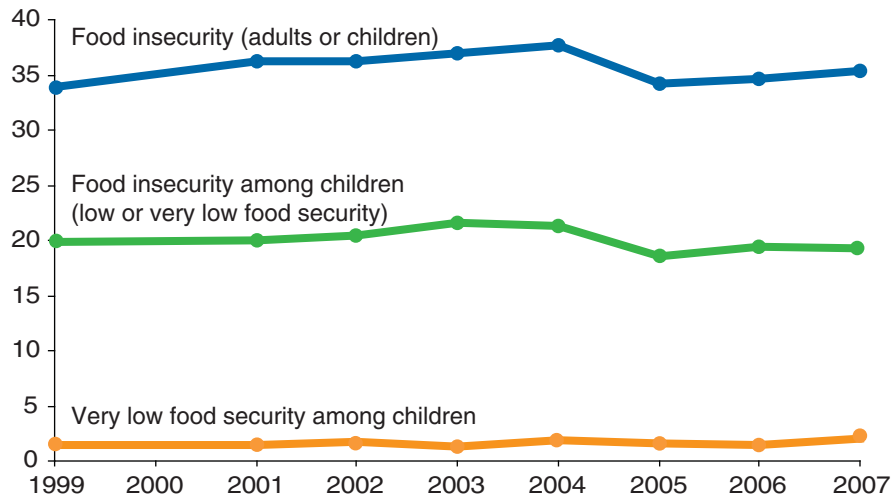
³ USDA statistics for 2000 also indicated a higher prevalence of food insecurity than in 1999. However, the 2000 survey was conducted in September, and surveys conducted in August and September have consistently indicated higher prevalence rates than those conducted in April and December. After adjusting for the expected seasonal component, the rate in 2000 was near or below that in 1999.

⁴ The Federal poverty line for a family of two adults and two children in 2007 was an annual income of \$21,027; 185 percent of the poverty line for that family was \$38,900.

Figure 4

Trends in food insecurity of households with children with annual incomes less than 185 percent of the Federal poverty line, 1995-2007

Percent of households



Source: Calculated by Economic Research Service using Current Population Survey Food Security Supplement data.

Food Insecurity Among Children in Selected Subpopulations, 2006-07 Average

The economic and demographic circumstances of households determine their food security to a great extent. In this section, the prevalence and distribution of food insecurity among children is described across nine sets of demographic, economic, and geographic characteristics that past research has found to be associated with food insecurity. Data for these analyses are from the December 2006 and December 2007 Current Population Survey Food Security Supplements. Data from 2 years were aggregated to provide more reliable estimates, especially for small subpopulations.

Three charts are presented for each set of household characteristics:

- A bar chart depicting, for households with each characteristic, the percentage that had food-insecure children and the percentage that had children with very low food security.
- A pie chart showing the distribution of households with food insecurity among children across the characteristics.
- A pie chart showing the distribution of households with very low food security among children across the characteristics.

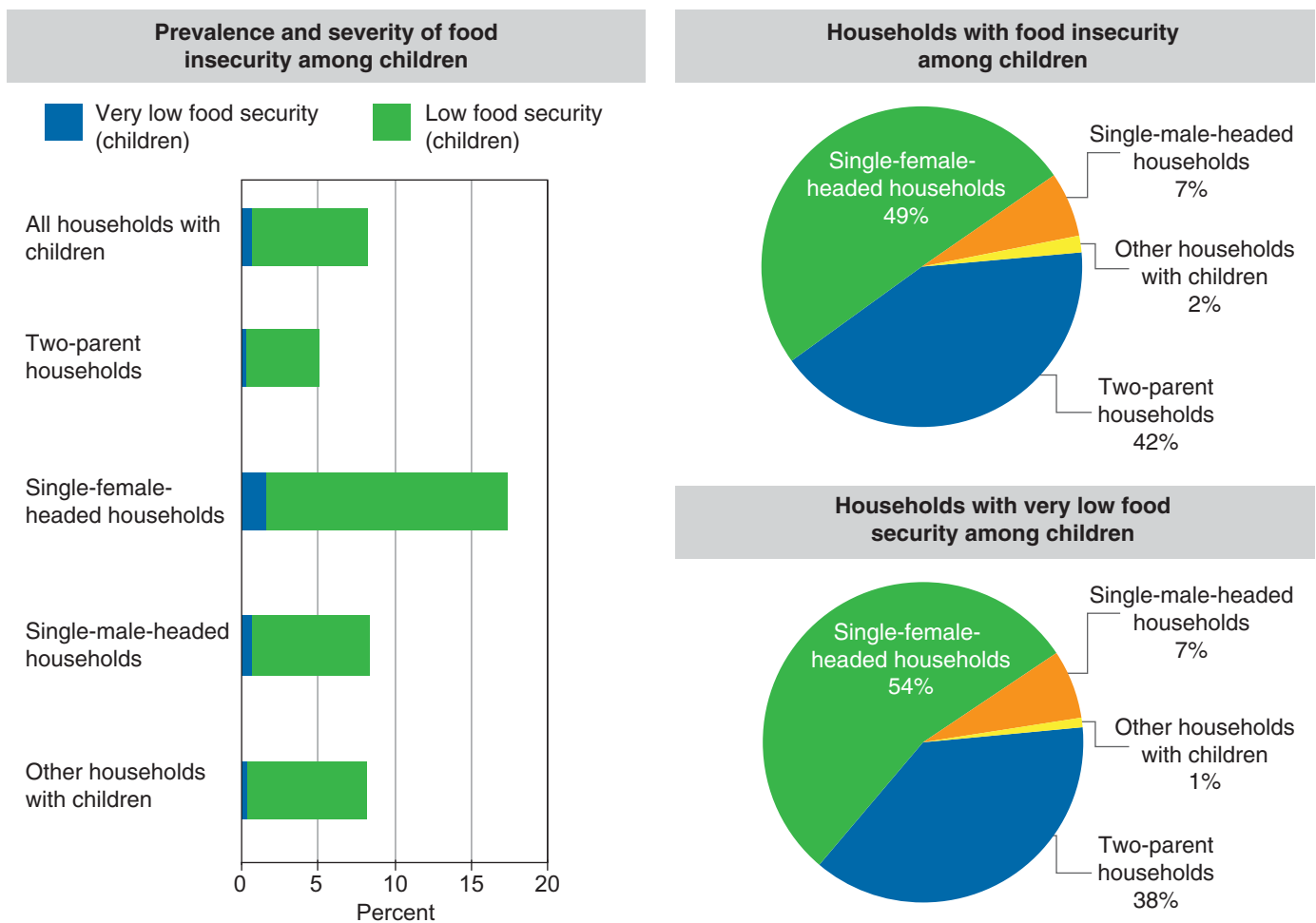
The numbers on which the graphic presentations in this section are based are presented in appendix table C-1. That table also includes statistics (not presented in the graphics) for the broader category of food insecurity that includes food insecurity among adults as well as children.

Household Composition

Food insecurity among children was about three times as prevalent in households headed by single women as in households headed by married couples and about twice as prevalent as in those headed by single men (fig. 5). About half of all households with food insecurity among children and 54 percent of households with very low food security among children were headed by single women. In spite of the lower rate of food insecurity among children in married-couple households, those households were a sizable minority (42 percent) of households with food insecurity among children.

Figure 5

Prevalence and distribution of food insecurity among children by household composition, 2006-07 average



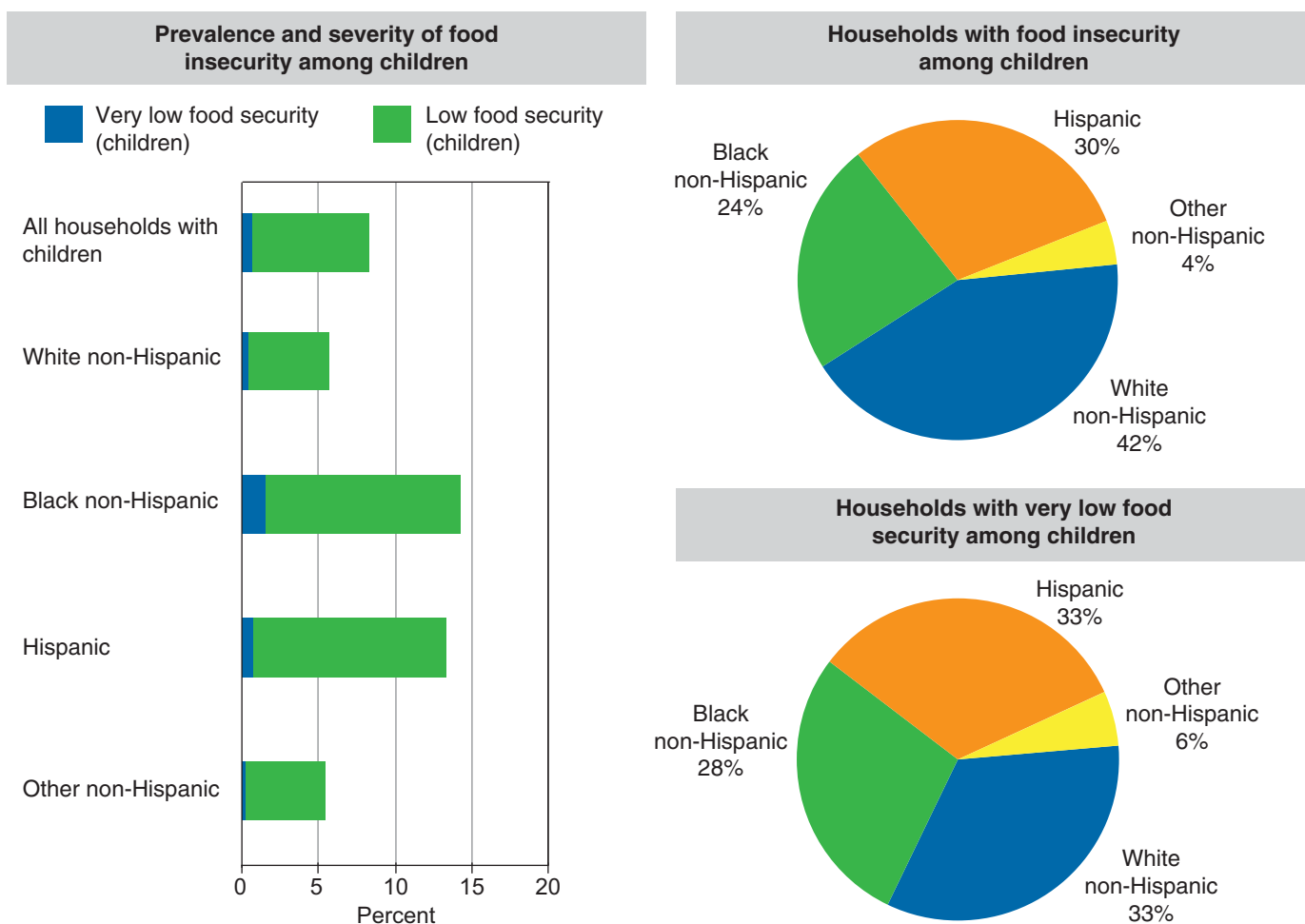
Source: Calculated by Economic Research Service using Current Population Survey Food Security Supplement data.

Race and Hispanic Ethnicity

Food insecurity among children was more than twice as prevalent among households headed by Black and Hispanic persons as among those headed by White non-Hispanics (fig. 6). Nevertheless, the largest number of households with food insecurity among children consisted of White non-Hispanics because of their larger share of the entire population. The most severe category, households with very low food security among children, was made up of nearly equal numbers of White non-Hispanic, Black non-Hispanic, and Hispanic households.

Figure 6

Prevalence and distribution of food insecurity among children by race and Hispanic ethnicity of household reference person, 2006-07 average



Source: Calculated by Economic Research Service using Current Population Survey Food Security Supplement data.

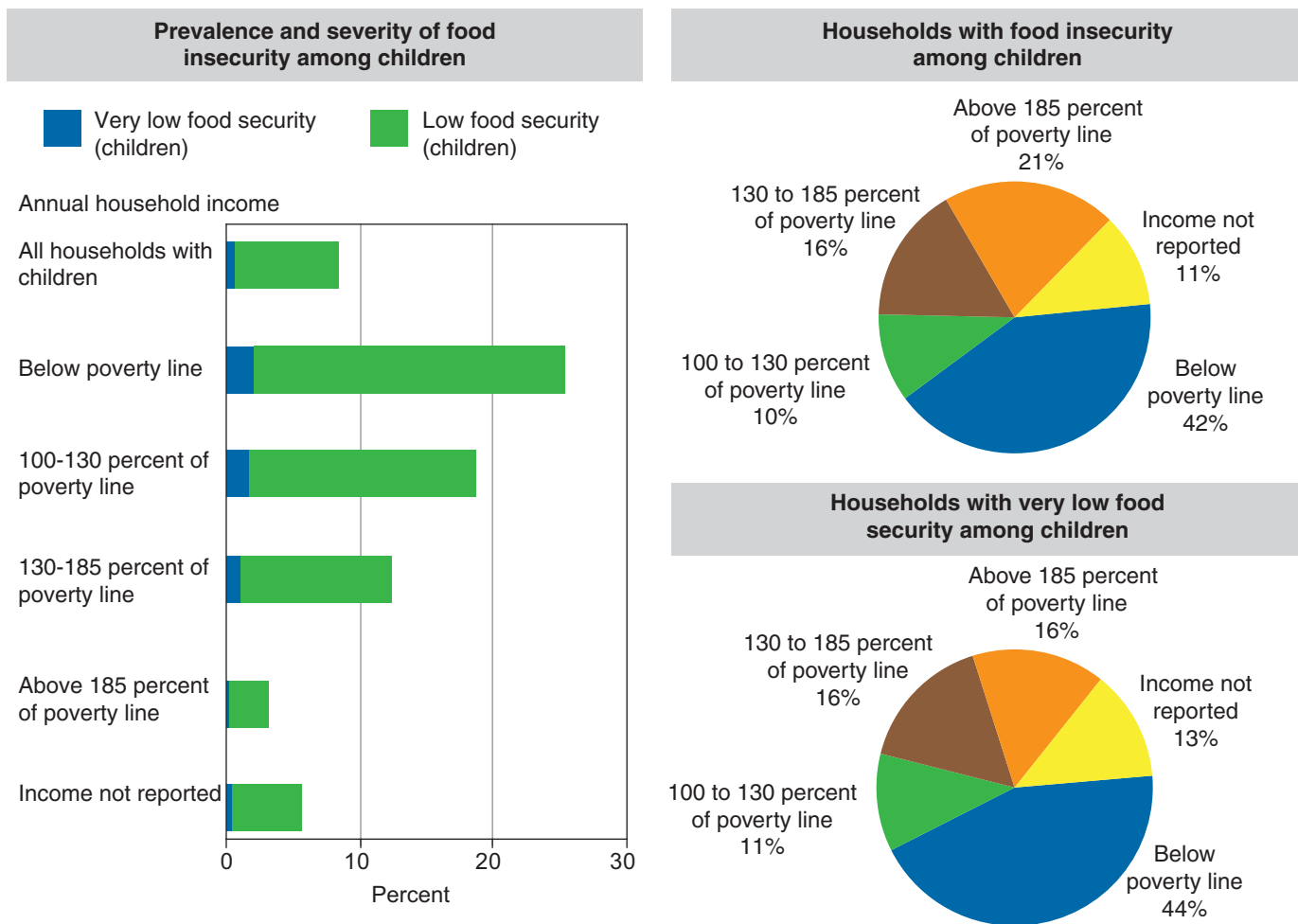
Household Income

About one-quarter of households with annual incomes below the Federal poverty line had food insecurity among children (fig. 7). They made up 42 percent of all households with food insecurity among children and 44 percent of households with very low food security among children.

The Federal food and nutrition assistance programs may not reach some households with food insecurity among children. Between 37 and 48 percent of households with food insecurity among children (the exact percentage depending on the income of those that did not report income) had annual incomes higher than 130 percent of the poverty line—the income eligibility limit for the Supplemental Nutrition Assistance Program (SNAP; formerly the Food Stamp Program) and for free school meals. Some of these households may have been eligible for those programs because income eligibility is determined by monthly rather than annual income. Nevertheless, it is likely that a large share were not eligible. Between 21 and 32 percent may have been ineligible for WIC or for reduced-price school lunches because their incomes were above 185 percent of the poverty line.

Figure 7

Prevalence and distribution of food insecurity among children by annual household income, 2006-07 average



Source: Calculated by Economic Research Service using Current Population Survey Food Security Supplement data.

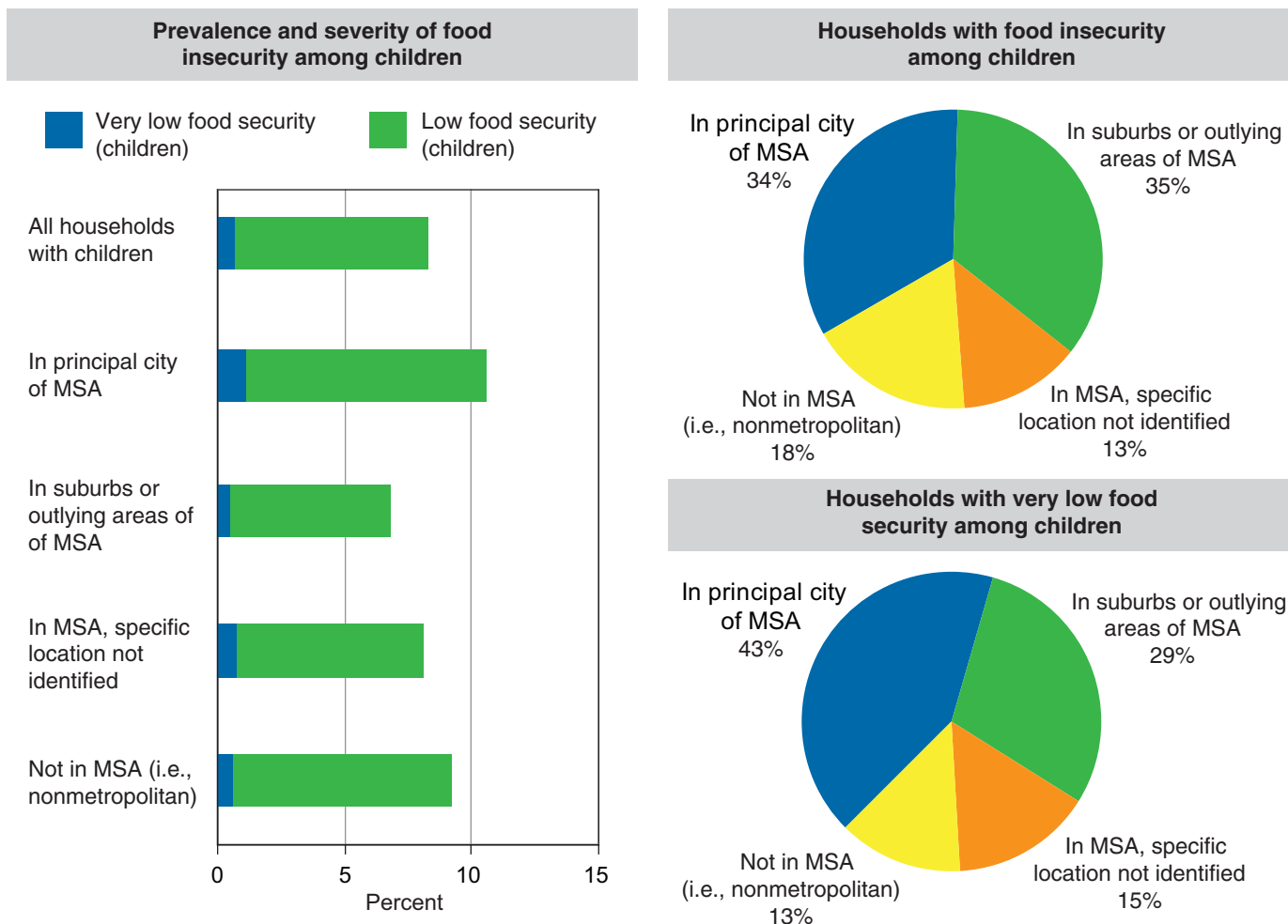
Residence Relative to Metropolitan Statistical Areas

Food insecurity among children was somewhat more prevalent in the large cities of Metropolitan Statistical Areas (MSAs) and in nonmetropolitan (largely rural) areas than in the suburban and exurban commuting areas around large cities (fig. 8).⁵ About 18 percent of households with food-insecure children were located in nonmetropolitan areas. The remainder were distributed about evenly between large cities of MSAs and the suburban and outlying commuting areas around MSAs. Very low food security among children was more heavily concentrated in the large cities of MSAs.

⁵ The food security survey identifies Metropolitan Statistical Areas (MSAs) and principal cities within them in accordance with standards delineated by the Office of Management and Budget in 2003, based on revised standards developed by the U.S. Census Bureau in collaboration with other Federal agencies. Principal cities include the incorporated areas of the largest city in each MSA and other cities in the MSA that meet specified criteria based on population size and commuting patterns.

Figure 8

Prevalence and distribution of food insecurity among children by residence relative to Metropolitan Statistical Areas (MSA), 2006-07 average



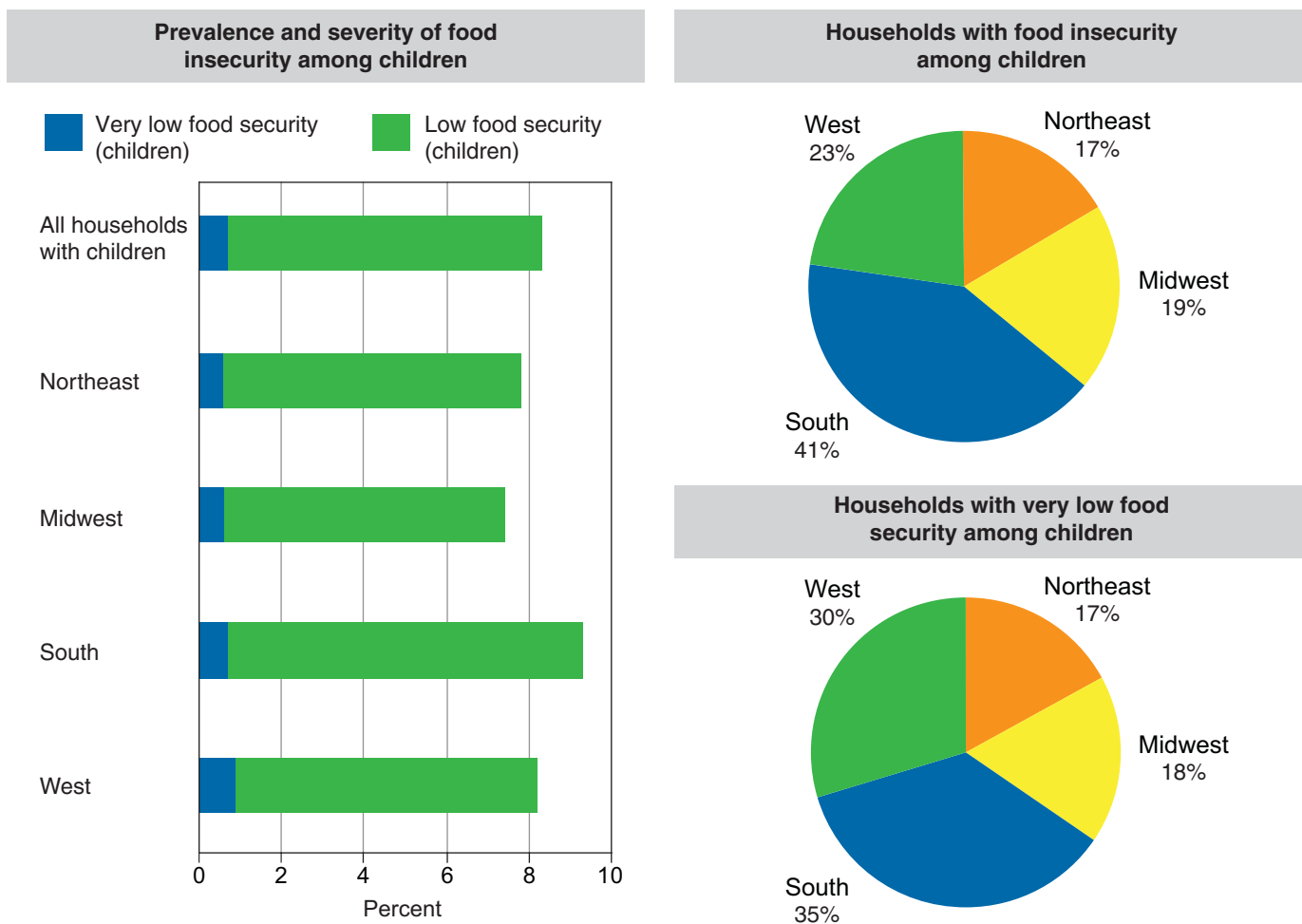
Source: Calculated by Economic Research Service using Current Population Survey Food Security Supplement data.

Residence by Census Region

The prevalence of food insecurity in households with children was somewhat higher in the South Census Region than in the other regions (fig. 9). The prevalence of very low food security was higher in the West than in the Midwest. Other differences among regions were in a range that could have resulted from sampling variation.

Figure 9

Prevalence and distribution of food insecurity among children by Census Region, 2006-07 average



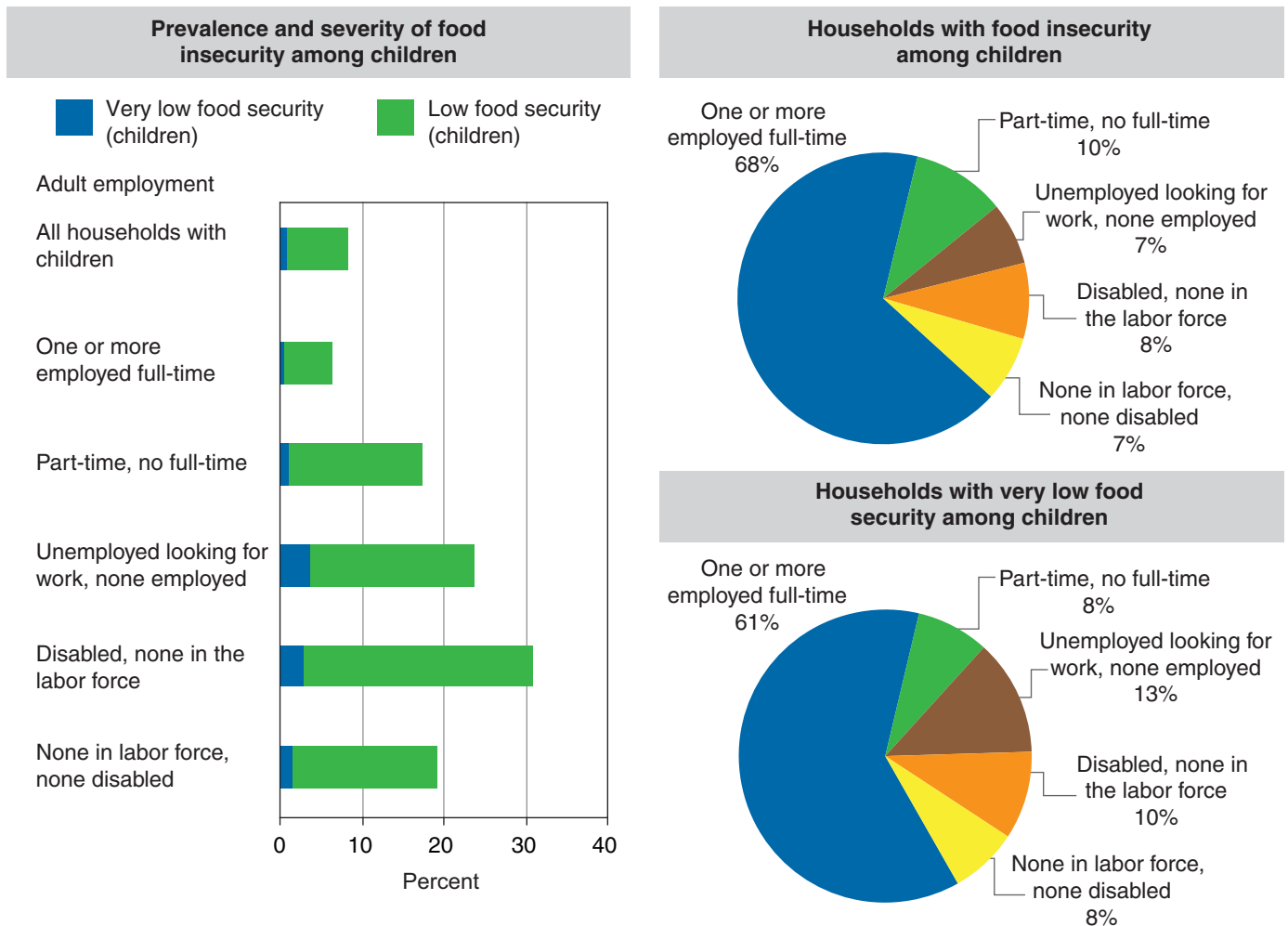
Source: Calculated by Economic Research Service using Current Population Survey Food Security Supplement data.

Employment and Labor Force Status of Adults in the Household

More than two-thirds of households with food insecurity among children had one or more full-time workers, and another 10 percent had one or more part-time workers (fig. 10). Rates of food insecurity among children were much higher for households with unemployed or disabled adults (and with none employed) than for those with employed adults. Together, the unemployed and disabled categories made up 15 percent of households with food insecurity among children and 23 percent of households with very low food security among children. Both employment opportunities and wage rates for less skilled workers appear to be important determinants of children's food security. Of all households with food-insecure children that had a nondisabled adult, only 7 percent had no adult in the labor force (that is, either employed or unemployed and looking for work).

Figure 10

Prevalence and distribution of food insecurity among children by employment and labor force status of adults in the household, 2006-07 average



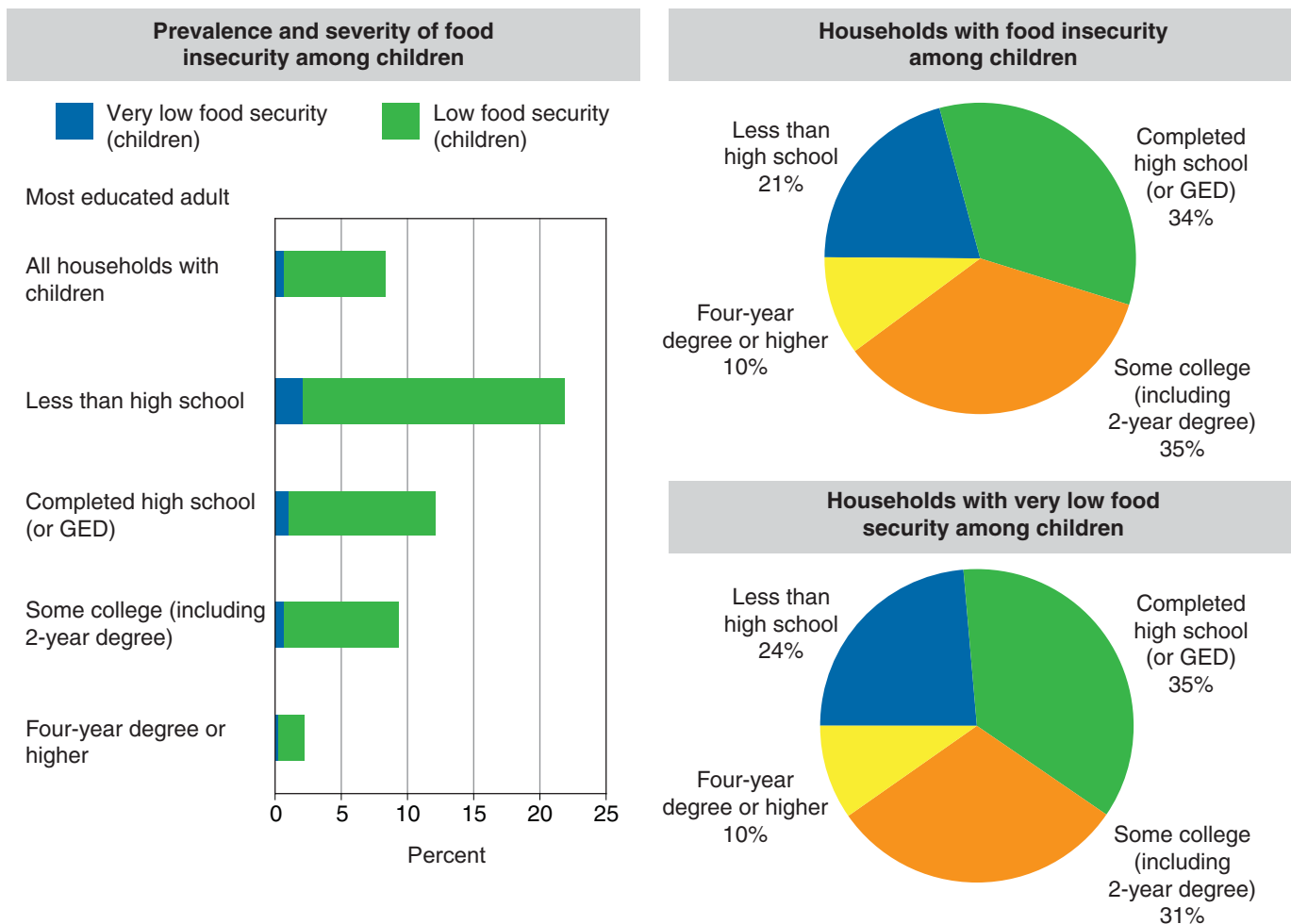
Source: Calculated by Economic Research Service using Current Population Survey Food Security Supplement data.

Educational Attainment of Adults in the Household

The percentage of households with food insecurity among children is strongly associated with the education of adults in the households (fig. 11). Food insecurity was 10 times more prevalent in households in which no adult had completed high school (22 percent) than in households in which an adult had a 4-year college degree (2.3 percent). In 55 percent of households with food insecurity among children and 59 percent of those with very low food security among children, no adult had any education beyond high school.

Figure 11

Prevalence and distribution of food insecurity among children by educational attainment of most educated adult in the household, 2006-07 average



Source: Calculated by Economic Research Service using Current Population Survey Food Security Supplement data.

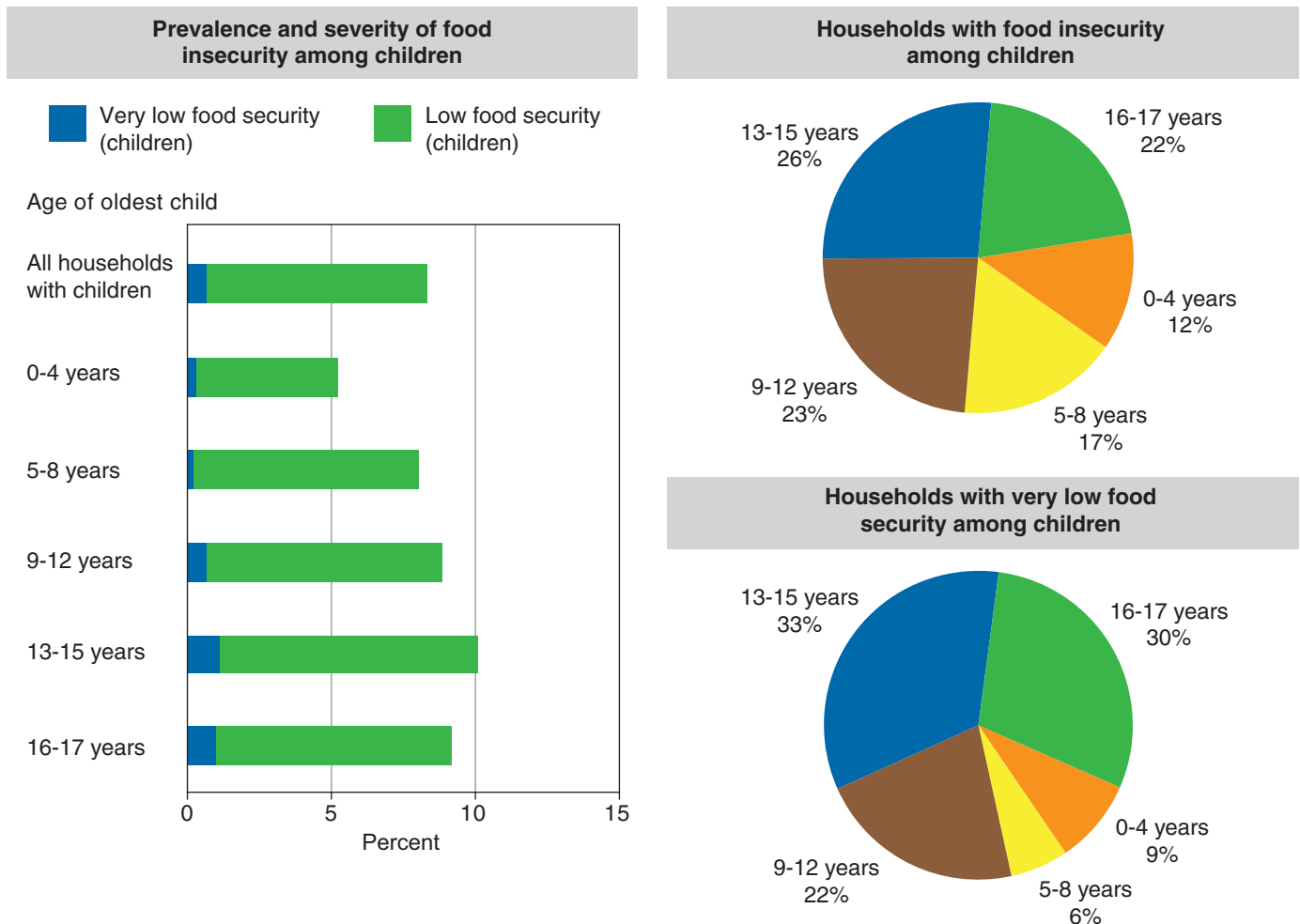
Age of Oldest Child

Most parents attempt to shield their children from the more severe effects of food insecurity, even when it means reducing their own food intake. Only about one out of six households with very low food security among adults had very low food security among children (analysis not shown).

Younger children are shielded from food insecurity to a greater extent than older children. The food security survey does not collect information on the food security of each individual child in the household, but the association of the age of the oldest child with food insecurity in any of the children is evidence of the greater protection afforded to younger children (fig. 12). Food insecurity among children was about twice as prevalent in households with teenage children as in households in which the oldest child was 4 years old or younger. Very low food security among children was about four times as prevalent in households with teenage children as in households in which the oldest child was 8 years old or younger. Multivariate analysis (not shown) confirms that this association is largely independent of the number of children in the household and the greater food needs of older children.

Figure 12

Prevalence and distribution of food insecurity among children by age of oldest child in the household, 2006-07 average



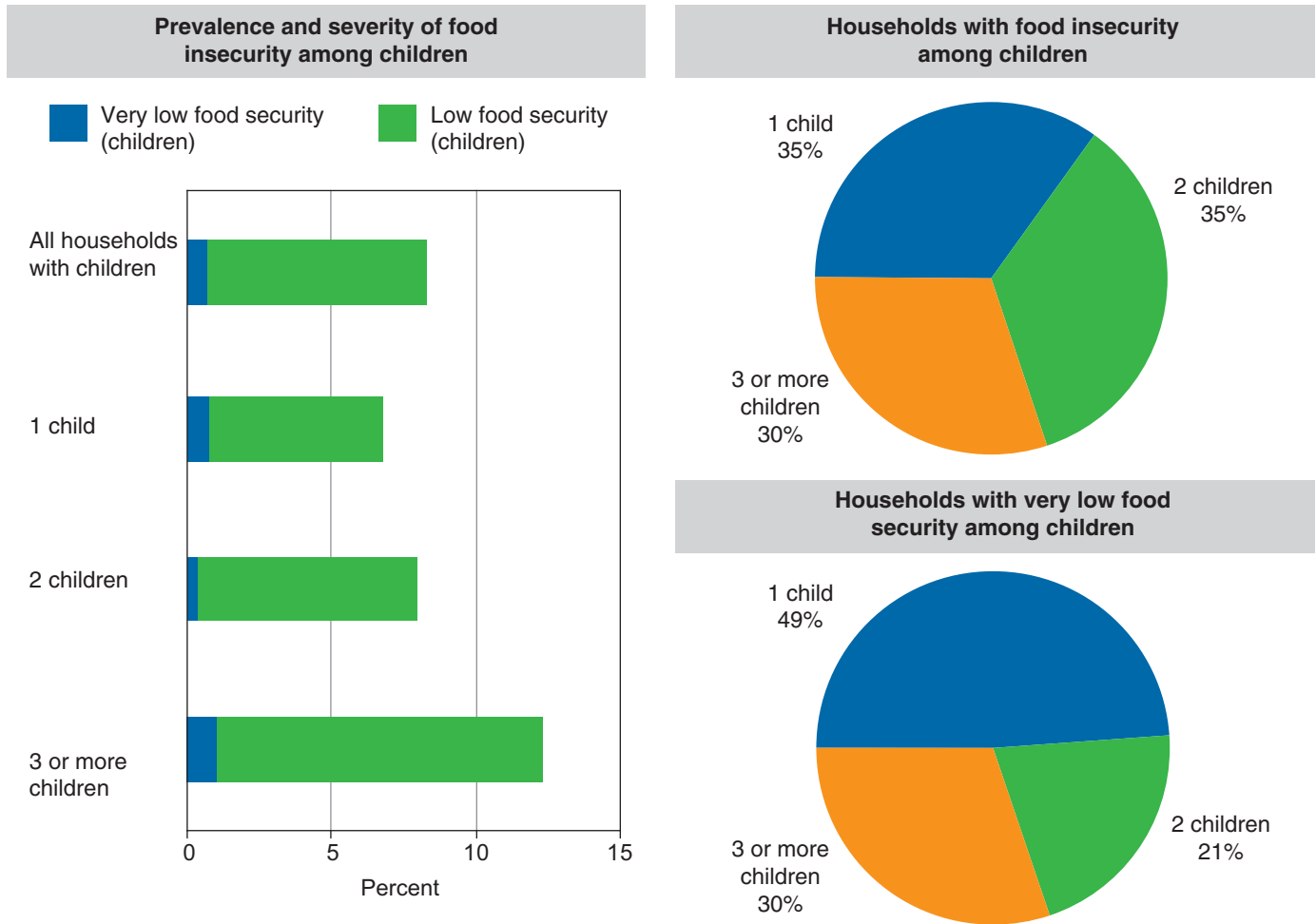
Source: Calculated by Economic Research Service using Current Population Survey Food Security Supplement data.

Number of Children in the Household

Food insecurity among children was more prevalent in larger families, especially in those with three or more children (fig. 13). The prevalence of very low food security among children was higher in households with one child or with three or more children than in households with two children.

Figure 13

Prevalence and distribution of food insecurity among children by number of children in the household, 2006-07 average



Source: Calculated by Economic Research Service using Current Population Survey Food Security Supplement data.

Food and Nutrition Assistance Program Participation and Children's Food Insecurity, 2006-07 Average

A large majority of food-insecure households with children received assistance from one or more of the three largest Federal food and nutrition assistance programs: the Supplemental Nutrition Assistance Program (SNAP), formerly called the Food Stamp Program, the National School Lunch Program, and the Special Supplemental Nutrition Assistance Program for Women, Infants, and Children (WIC). Table 1 and figure 14 show the prevalence rates of overall food insecurity and food insecurity among children for low-income households participating in these programs.⁶

A 30-day measure of food insecurity (covering mid-November to mid-December) is used for these statistics rather than the standard 12-month measure, so that the period over which food security is assessed is more likely to match the period during which program benefits were received or not received. The prevalence of food insecurity is lower when assessed over a 30-day period, since some households were food insecure only in earlier months of the year. The prevalence of food insecurity in households with children and with incomes less than 185 percent of the Federal poverty line was 19.6 percent during the 30 days prior to the food security surveys in 2006 and 2007, compared with 35.0 percent that were food insecure at some time during the year (calculated from appendix table C-1). For food insecurity among children, the 30-day prevalence was 11.2 percent of households compared with 19.4 percent when assessed over 12 months.

Eighty-one percent of low-income households with food insecurity among children received assistance from one or more of the three largest Federal food assistance programs. About 69 percent received free or reduced-price school meals, including 35 percent that also received benefits from SNAP or WIC or both. Many households in this income range were not eligible for all of these programs, and some were not eligible for any of them. About one-third had annual incomes higher than 130 percent of the poverty line (the gross income eligibility limit for SNAP); most of those were income-ineligible for SNAP. Households with no children in school were not eligible for free or reduced-price school lunches, and those with no children under age 5 were not eligible for WIC unless a woman in the household was pregnant.

Households that did not receive assistance from any of these programs were generally more food secure than those that did. The prevalence of food insecurity was lower (10.7 percent) for nonparticipating households than for any of the recipient categories. This probably reflects the self-selection of the most food-needy households into the programs.

⁶ Statistics on very low food security among children are not presented by program participation categories due to inadequate sample sizes in some categories. Numbers of households are not reported because about 16 percent of households with children do not report income. Most such households are not asked about participation in food and nutrition assistance programs. The omission of those households would result in understating the numbers of households in the various participation categories. Participation in food and nutrition assistance programs is also underreported in the CPS-FSS, which would further distort estimated numbers of participants.

Table 1

Prevalence and distribution of food insecurity during the 30-day period ending in mid-December in low-income¹ households with children, by receipt of benefits from Federal food assistance programs, 2006-07 average

Characteristic	Households with food insecurity among adults or children		Households with food insecurity among children (low or very low food security among children)	
	Prevalence ²	Share ³	Prevalence ⁴	Share ⁵
	<i>Percent</i>			
All low-income households with children ¹	19.6	100.0	11.2	100.0
Received SNAP (food stamps) in past 30 days	28.5	39.3	15.6	37.9
Received free or reduced-price school lunch in past 30 days	25.5	64.6	15.4	68.8
Received WIC in past 30 days	22.9	23.5	10.6	19.0
Multiple-program patterns:				
Received SNAP (food stamps) and free or reduced-price school lunch and WIC	25.1	6.1	13.8	5.9
Received SNAP (food stamps) and free or reduced-price school lunch	31.6	22.7	19.2	24.3
Received SNAP (food stamps) and WIC	22.8	4.6	5.4	1.9
Received SNAP (food stamps) only	26.8	5.4	15.2	5.4
Received free or reduced-price school lunch and WIC	25.9	5.9	12.7	5.1
Received free or reduced-price school lunch only	22.1	28.8	14.1	32.4
Received WIC only	19.3	6.7	10.1	6.1
Received benefits from one or more of these programs	24.6	80.1	14.3	81.0
Did not receive benefits from any of these programs	10.7	19.8	5.8	19.0

¹ Analysis was limited to households with children and with annual incomes less than 185 percent of the Federal poverty line. Most households with incomes above that range were not asked whether they received benefits from food assistance programs. In 2007, the poverty line for a family of two adults and two children was an annual income of \$21,027.

² Households with food insecurity among adults or children as a percentage of all households with the specified characteristic.

³ Households with the specified characteristic and with food insecurity among adults or children as a percentage of all households with food insecurity among adults or children.

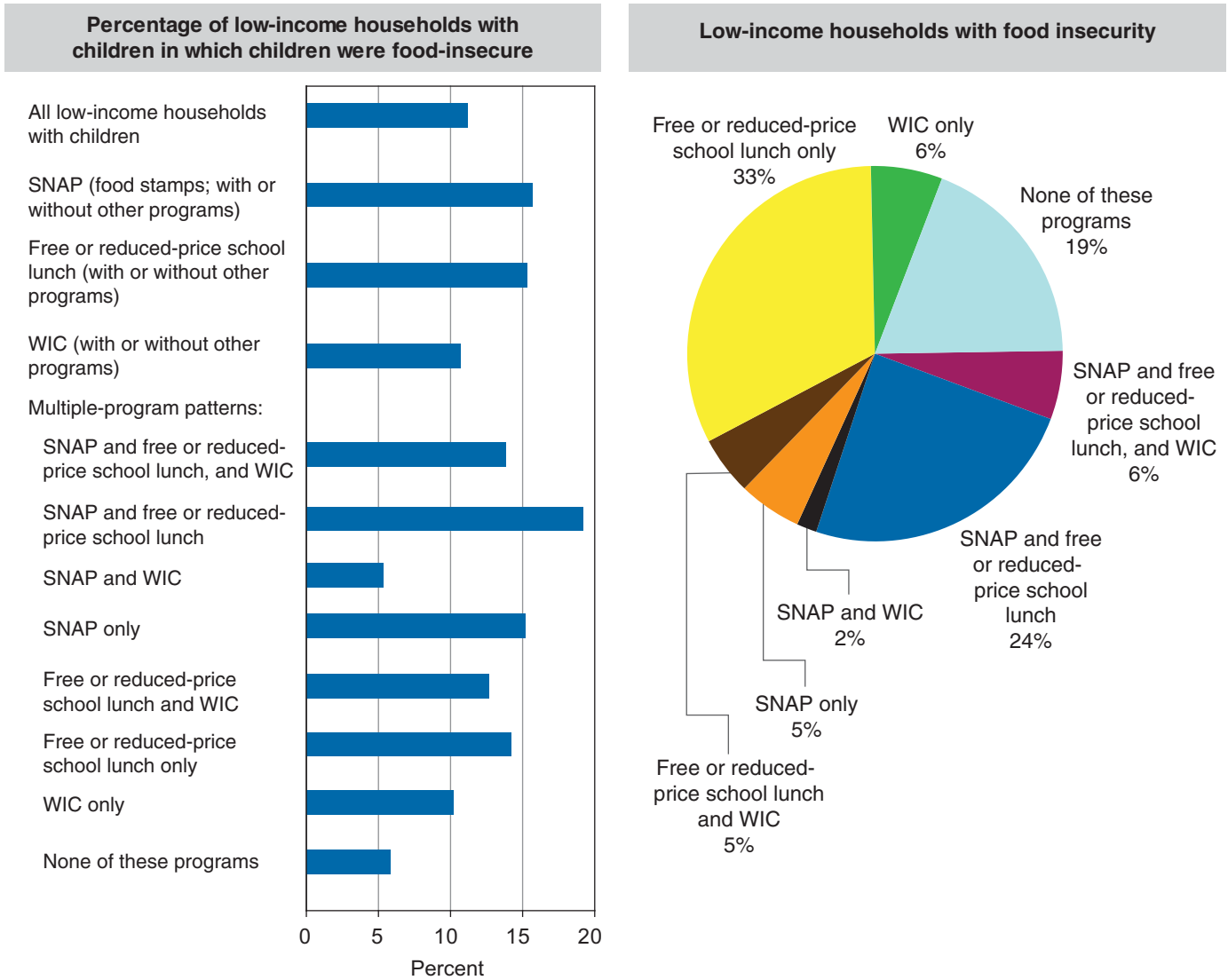
⁴ Households with food insecurity among children as a percentage of all households with the specified characteristic.

⁵ Households with the specified characteristic and with food insecurity among children as a percentage of all households with food insecurity among children.

Source: Calculated by Economic Research Service using Current Population Survey Food Security Supplement data.

Figure 14

Prevalence and distribution of food insecurity among children in low-income¹ households during the 30-day period prior to the food security survey, by participation in selected Federal food and nutrition assistance programs, 2006-07 average



¹Households with annual incomes less than 185 percent of the Federal poverty line. (In 2007, the poverty line for a family of two adults and two children was an annual income of \$21,027.)

Source: Calculated by Economic Research Service using Current Population Survey Food Security Supplement data.

Table 2

Prevalence and distribution of food insecurity during the 30-day period ending in mid-December in households with children with annual incomes less than 130 percent of the Federal poverty line,¹ by receipt of SNAP (food stamp) benefits, 2006-07 average

Characteristic	Households with food insecurity among adults or children		Households with food insecurity among children (low or very low food security among children)	
	Prevalence ²	Share ³	Prevalence ⁴	Share ⁵
	<i>Percent</i>			
Received SNAP (food stamps) in past 30 days	28.5	47.0	16.1	45.5
Received SNAP (food stamps) in past 12 months, but not during past 30 days	35.5	12.4	19.6	11.7
Did not receive SNAP (food stamps) at any time in past 12 months	17.6	40.7	10.8	42.8

¹ In 2007, the poverty line for a family of two adults and two children was an annual income of \$21,027.

² Households with food insecurity among adults or children as a percentage of all households with the specified characteristic.

³ Households with the specified characteristic and with food insecurity among adults or children as a percentage of all households with food insecurity among adults or children.

⁴ Households with food insecurity among children as a percentage of all households with the specified characteristic.

⁵ Households with the specified characteristic and with food insecurity among children as a percentage of all households with food insecurity among children.

Source: Calculated by Economic Research Service using Current Population Survey Food Security Supplement data.

Some households leave SNAP because their economic situation has improved enough for them to cover their food needs without assistance. However, for many SNAP recipients who exit the program, that does not seem to be the case. Households with children that received SNAP earlier in the year, but not in the 30 days prior to the food security survey, were more likely to be food insecure during that 30-day period (35.5 percent; table 2) than those still receiving benefits (28.5 percent), and much more likely to be food insecure than low-income households that did not receive SNAP benefits at any time during the year (17.6 percent).

Food Insecurity in Households with Children by State, 2001-2007 Average

Data from nine national surveys (April 2001 and December of each year 2001-07) were combined to provide sufficient sample sizes (numbers of households interviewed) for reliable State-level estimates (table 3 and fig. 15). The long time period for these State-level statistics should be kept in mind when interpreting the statistics, as conditions in some States may have changed during the period. Even with data from nine surveys, the prevalence of very low food security among children could not be estimated reliably for some States and is not reported in table 3.⁷

The prevalence of food insecurity (among adults or children or both) in households with children ranged from 10.1 percent in New Hampshire to 21.5 percent in Texas. Taking into account margins of error due to sampling variation, the prevalence of food insecurity in households with children was below the national average (16.2 percent) in 19 States, above the national average in 13 States and the District of Columbia, and near the national average (i.e., the difference from the national average was not statistically significant) in 18 States. The percentage of households with food insecurity among children ranged from 4.8 percent in New Hampshire to 12.6 percent in Texas.

⁷ In spite of sizable denominators (all households with children interviewed) in all States, the number of interviewed households with very low food security among children was less than 10 in several States and as few as 3 in some. Estimates based on such small numerators are unreliable because an error in measurement, or the chance selection or omission of a single household in the sample, could change the estimate by a large proportion.

Table 3

Prevalence of food insecurity in households with children by State, 2001-07 average¹

State	Number of households		Households with food insecurity among adults or children (low or very low food security)		Households with food insecurity among children (low or very low food security among children)	
	Average 2001-07	Interviewed	Prevalence	Margin of error ²	Prevalence	Margin of error ²
	<i>Number</i>	<i>Number</i>	<i>Percent</i>	<i>Percentage points</i>	<i>Percent</i>	<i>Percentage points</i>
U.S. total	39,241,000	122,324	16.2	0.22	8.7	0.10
AK	95,000	1,890	15.1	1.48	7.4*	0.89
AL	617,000	1,610	17.6	1.61	8.5	1.26
AR	377,000	1,440	20.8*	2.03	11.2*	1.50
AZ	775,000	1,736	18.7*	1.76	9.7	1.21
CA	4,868,000	9,287	17.1*	0.80	10.4*	0.62
CO	626,000	2,579	14.5*	1.44	8.0	1.06
CT	471,000	2,329	11.9*	1.28	6.8*	1.02
DC	55,000	969	19.9*	2.13	9.0	1.80
DE	112,000	1,655	11.6*	1.47	6.3*	0.96
FL	2,065,000	4,432	16.5	1.00	9.3	0.82
GA	1,222,000	2,166	18.3*	1.64	9.2	1.25
HI	158,000	1,638	13.2*	1.52	6.9*	1.10
IA	381,000	2,219	15.9	1.34	7.5*	0.89
ID	197,000	1,675	20.1*	2.02	9.7	1.43
IL	1,708,000	4,105	13.0*	1.09	7.0*	0.61
IN	840,000	2,226	13.0*	1.45	6.2*	1.02
KS	367,000	2,068	16.9	1.28	8.8	1.01
KY	562,000	1,731	17.8	1.93	8.0	1.11
LA	627,000	1,277	17.0	1.48	9.1	1.11
MA	809,000	2,007	10.8*	1.19	6.4*	0.91
MD	751,000	2,373	11.4*	1.14	6.5*	0.98
ME	161,000	2,090	16.0	1.70	7.7*	0.96
MI	1,376,000	3,268	15.3	1.51	7.6*	0.87
MN	674,000	2,617	11.3*	1.26	5.7*	0.78
MO	777,000	2,068	16.1	1.48	8.3	1.18
MS	415,000	1,282	20.5*	2.21	11.3*	1.75
MT	114,000	1,258	17.9	2.08	8.4	1.28
NC	1,125,000	2,471	18.6*	1.85	10.0*	1.22
ND	82,000	1,754	10.4*	1.46	5.3*	0.91
NE	237,000	2,001	14.8	1.51	7.3*	0.88
NH	172,000	2,351	10.1*	1.16	4.8*	0.62
NJ	1,182,000	2,790	12.5*	1.21	6.9*	0.95
NM	265,000	1,373	20.9*	2.06	12.4*	1.76
NV	310,000	2,200	15.1	1.82	8.6	1.12
NY	2,511,000	5,336	14.8*	0.97	8.0*	0.54
OH	1,545,000	3,713	17.4	1.40	8.2	0.83
OK	474,000	1,632	20.0*	1.41	10.5*	1.11
OR	454,000	1,726	18.7*	1.66	9.5	0.99
PA	1,533,000	3,917	14.7*	1.04	7.2*	0.78
RI	138,000	1,988	14.1*	1.79	7.3*	1.26
SC	552,000	1,562	17.6	1.61	9.2	1.25
SD	100,000	1,961	13.5*	1.59	6.7*	0.99
TN	813,000	1,589	18.6*	1.99	8.9	1.36
TX	3,269,000	6,123	21.5*	1.40	12.6*	1.09
UT	351,000	1,932	18.6*	1.55	9.7	1.25
VA	988,000	2,237	11.9*	1.49	6.2*	0.87
VT	84,000	1,741	14.2*	2.01	6.4*	1.12
WA	829,000	2,213	16.4	1.37	8.5	0.89
WI	734,000	2,501	13.2*	1.11	7.1*	0.94
WV	224,000	1,511	14.5	1.78	6.5*	1.61
WY	69,000	1,707	15.6	1.78	9.0	1.16

*Difference from U.S. average was statistically significant with 90-percent confidence ($t > 1.645$).

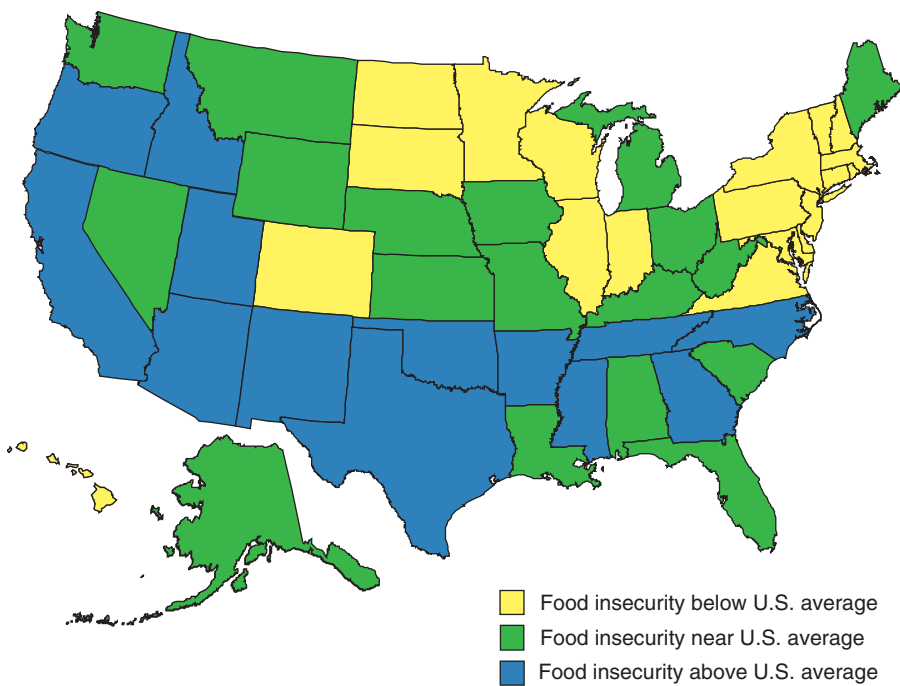
¹Estimation sample included two surveys in 2001, conducted in April and December. Totals exclude households whose food security status is unknown because they did not give a valid response to any of the questions in the food security scale. These represented about 0.3 percent of all households in each year.

²Margin of error with 90-percent confidence (1.645 times the standard error of the estimated prevalence rate).

Source: Calculated by Economic Research Service using Current Population Survey Food Security Supplement data.

Figure 15

Prevalence of food insecurity (adults or children) in households with children, 2001-07 average



Source: Calculated by Economic Research Service using Current Population Survey Food Security Supplement data.

Conclusions

In 2007, 15.8 percent of households with children were food insecure at some time during the year. In about half of those households, only adults were food insecure; in the other half, children were also food insecure. In 0.8 percent of households with children, one or more of the children experienced very low food security. In households with very low food insecurity among children—the most severe food-insecure condition measured by USDA—children’s eating patterns were disrupted and their food intake was reduced below levels considered adequate by caregivers.

A range of studies using different data sources suggests that children living in food-insecure households face elevated risks of problematic health and development outcomes, compared with children in otherwise similar food-secure households.

Findings from this study suggest that job opportunities, wage rates, and work supports (such as earned-income tax credits, child care subsidies, and supplemental nutrition assistance available to working households) are likely to be key determinants of food insecurity in low-income households with children. A large majority of households with food-insecure children—about 85 percent—have one or more adults in the labor force, including almost 70 percent with at least one full-time worker. However, fewer than half of households with food-insecure children include an adult with any education beyond high school, and only 10 percent include an adult with a 4-year college degree. Thus, employment opportunities and wage rates for less skilled or less educated workers are particularly important factors affecting the food security of children. Work supports and support for education and training may also be important. Income and nutrition supports for workers between jobs could also contribute to food security, as evidenced by the high rate of children’s food insecurity in households with unemployed adults.

In 2006-07, the Federal food and nutrition assistance programs provided benefits to four out of five low-income (less than 185 percent of the poverty line) food-insecure households with children. Children in about 70 percent of such households received free or reduced-price school meals, about 40 percent of the households received SNAP (food stamp) benefits, and about 20 percent received WIC benefits. Many households received assistance from two or all three of the programs, although one-third reported receiving only free or reduced-price school meals. Low-income households that did not receive assistance from any of the programs were less likely to be food insecure (11 percent) than those that did receive assistance (19 to 32 percent, depending on the mix of programs). This difference suggests that program-related factors, such as a lack of program outreach, are not the primary reasons for nonparticipation by eligible households; rather, a large majority of nonparticipants are able to meet their food needs without assistance.

About one in five households with food insecurity among children had annual incomes above 185 percent of the poverty line. Many households with annual incomes in this range may not be eligible to receive free or reduced-price school lunches or assistance from the WIC program, and most are probably not eligible to receive SNAP benefits.

Food insecurity among children was more likely in households that had left SNAP during the previous year than for those currently receiving benefits. This suggests that some households leave the program even though their economic resources are not yet adequate to meet their food needs.

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Appendix A. Questions used to assess the food security of households in USDA's annual food security survey

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. (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?
6. 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)
7. In the last 12 months, were you ever hungry, but didn’t eat, because there wasn’t enough money for food? (Yes/No)
8. In the last 12 months, did you lose weight because because there wasn’t 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?

(Questions 11-18 were asked only if the household included children ages 0-18)

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)

Coding of Responses

Questions 1-3 and 11-13 are coded as affirmative (i.e., possibly indicating food insecurity) if the response is “often” or “sometimes.” Questions 5, 10, and 17 are coded as affirmative if the response is “almost every month” or “some months but not every month.” The remaining questions are coded as affirmative if the response is “yes.”

Assessing Food Security Status

Households are classified as food insecure if they report three or more indications of food insecurity in response to the entire set of 18 questions.

The food security status of children in the household is assessed by responses to the child-referenced questions, 11-18. Households reporting two or more of these conditions are classified as having food insecurity among children. Households reporting five or more are classified as having very low food security among children.

Appendix B

Appendix table B-1—Findings from selected studies on the effects of food insecurity and food insufficiency on children’s health, development, and well-being (statistically significant associations, with controls included in the model, are shaded)¹

Condition studied	Population	Finding	Data ²	Comments	Citation
Weight and BMI	Children in first, third, and fifth grade	Weak, nonsignificant negative association with food insecurity in current period (for boys, girls, and combined).	ECLS-K	Extensively specified dynamic model controlled for weight in previous period (kindergarten, first, and third grade).	Bhargava et al., 2008
General health (parent-reported)	Children ages 9 and 24 months	Poor or fair health (vs. excellent or good) more likely in food-insecure hh. Main pathway is through parental depression, direct effect marginally significant (p=.09), not through measured parenting or feeding practices.	ECLS-B	Could be biased by measurement artifact of parental depression, leading to upward bias on measured food insecurity and children’s poor health.	Bronte-Tinkew et al., 2007
Weight for length (overweight)	Children ages 9 and 24 months	Higher weight for length in food-insecure hh. Pathway is through parenting practices and infant feeding practices (mainly a measure of breastfeeding).		Structural model may be problematic. Food insecurity associated with better infant feeding practices and marginally significant (p=.07).	
Length for age	Children ages 9 and 24 months	No significant association with food insecurity or mediating variables.			
Behavioral problems (problem in one or more of three domains: aggressive, anxious/depressed, inattention/hyperactivity)	Children age 3 years	Significant behavioral problems 1.6 times more likely in hh with marginal food security among adults and 2.1 times more likely in hh with food-insecure adults. Similar and statistically significant associations with each problem domain individually.	Fragile Families	Strong results in a large sample. In addition to demographic and economic controls, mother’s mental health (which could be a confounding measurement factor) was controlled.	Whitaker et al., 2006
Iron deficiency anemia	Children age 7-36 months	2.5 times more likely in hh with food insecurity among children.	C-SNAP	Sample was small. Should be repeated with larger sample.	Skalicky et al., 2006
Anemia without iron deficiency	Children age 7-36 months	1.6 times more likely in hh with food insecurity among children, but not statistically significant.		“ “	
Change in BMI and weight from kindergarten to third grade	Girls in third grade	Higher in households with marginal food security or insecurity at kindergarten age; higher in households with marginal food security or insecurity in both kindergarten and third grade.	ECLS-K		Jyoti et al., 2005
	Boys in third grade	No statistically significant association.			

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Appendix table B-1—Findings from selected studies on the effects of food insecurity and food insufficiency on children’s health, development, and well-being (statistically significant associations, with controls included in the model, are shaded)¹ (continued)

Condition studied	Population	Finding	Data ²	Comments	Citation
Change in BMI and weight from kindergarten to third grade	Girls in third grade	Higher in households with marginal food security or insecurity at kindergarten age; higher in households with marginal food security or insecurity in both kindergarten and third grade.	ECLS-K		Jyoti et al., 2005
	Boys in third grade	No statistically significant association.			
Change in math score from kindergarten to third grade	Girls and boys in third grade	Lower in households marginally food secure or food insecure in kindergarten than in households food secure in both kindergarten and third grade.			
Change in reading score from kindergarten to third grade	Girls in third grade	Lower in households marginally food secure or food insecure in third grade (or in both kindergarten and third grade) than in households food secure in both periods.			
	Boys in third grade	No statistically significant association.			
Change in social skills as assessed by teachers in kindergarten and third grade	Girls in third grade	Greater improvement in households that transitioned from marginally food secure or food insecure in kindergarten to food secure in third grade than in households food secure in both periods.			
	Boys in third grade	Smaller improvement (opposite of girls) in households that transitioned from marginally food secure or food insecure in kindergarten to food secure in third grade than in households food secure in both periods.		Unexpected finding, and unexpected that boys and girls have opposite patterns.	

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Appendix table B-1—Findings from selected studies on the effects of food insecurity and food insufficiency on children’s health, development, and well-being (statistically significant associations, with controls included in the model, are shaded)¹ (continued)

Condition studied	Population	Finding	Data ²	Comments	Citation
Physical function (a subscale of the Pediatric Health-Related Quality of Life measure)	Children age 3-17 years	Physical function of children in food-insecure hh 3.3 points lower (87.4 vs. 90.7 mean for children in food-secure households); association strongest for ages 3-8 years, weaker and not statistically significant for ages 9-11, and near zero for ages 12-17.	Delta NIRI		Casey et al., 2005
Psychosocial function (a subscale of the Pediatric Health-Related Quality of Life measure)	Children age 3-17 years	Psychosocial function of children in food-insecure hh 3.6 points lower (77.1 vs. 80.7 in food-secure hh); association was strongest for ages 12-17, weaker and not statistically significant for ages 3-8, and near zero for ages 9-11.			
Health status (reported by caregiver)	Children age 0-36 months	Fair or poor health (vs. excellent or good) nearly twice as likely in food-insecure hh; no dose-response pattern observed.	C-SNAP		Cook et al., 2004
Hospitalization since birth	“ “	30% more likely in food-insecure hh; dose response: 2.3 times more likely in hh with very low food security.			
Hospital admission on day of interview	“ “	Not statistically significant; weak negative association in sample.			
At risk for growth problems (either low weight for age or weight for height)	“ “	Not statistically significant; weak positive association in sample.			
Educational achievement—math score in Fall of kindergarten year	Kindergarteners	Lower by a half-point (mean math score was 19 points) in marginally secure and food-insecure hh. Some dose response: score 1 point lower in hh with very low food security.	ECLS-K		Winicki and Jemison, 2003
Educational achievement—gain in math score from Fall to Spring of kindergarten year	“ “	Lower by 0.4 points (mean gain in math score was 8 points) in marginally secure or food-insecure hh; no dose-response pattern.			

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Table B-1—Findings from selected studies on the effects of food insecurity and food insufficiency on children’s health, development, and well-being (statistically significant associations, with controls included in the model, are shaded)¹ (continued)

Condition studied	Population	Finding	Data ²	Comments	Citation
Physical growth—height, weight, BMI, and changes in these from Fall to Spring	Kindergarteners	Not statistically significant; associations in the sample weak and inconsistent.	ECLS-K		Winicki and Jemison, 2003
Depressive disorder and suicidal symptoms	Adolescents age 15-16	Adolescents in food insufficient hh much more likely to have depressive disorder and suicidal symptoms.	NHANES III		Alaimo et al., 2002
Chronic condition health count	Preschool children	Significantly higher in hh with moderate child hunger.	Worcester, MA survey of homeless and low-income, housed mothers and children		Weinreb et al., 2002
	School-age children	Significantly higher in hh with severe child hunger (measured by CCHIP items). ³			
Internalizing behavior problems (based on Child Behavior Checklist)	Preschool- and school-age children	Significantly higher in hh with severe child hunger, associations positive but weaker and not statistically significant with moderate child hunger.			
Anxiety/Depression (based on Child Behavior Checklist)	School-age children	Significantly higher in hh with severe child hunger.			
Academic achievement (based on Wechsler Individual Achievement Test Screener)	School-age children	No statistically significant association.			
Risk of overweight (weight-for-age higher than 85th percentile on CDC growth chart)	Girls ages 2-7	Significantly lower in food-insufficient hh.		NHANES III	
	Boys ages 2-7	No statistically significant association.			
	Boys ages 8-16	No statistically significant association.			
	White non-Hispanic girls ages 8-16	No statistically significant association.			
	Black non-Hispanic girls ages 8-16	No statistically significant association.			
	Mexican-American girls ages 8-16	Significantly higher in food-insufficient hh.			

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Table B-1—Findings from selected studies on the effects of food insecurity and food insufficiency on children’s health, development, and well-being (statistically significant associations, with controls included in the model, are shaded)¹ (continued)

Condition studied	Population	Finding	Data ²	Comments	Citation		
Fair or poor health status (vs. excellent or good)	Children age 1-5 years	49 percent more likely in food-insufficient hh.	NHANES III		Alaimo et al., 2001b		
	Children age 6-16 years	58 percent more likely in food-insufficient hh.					
Frequent stomach aches	Children age 4-5 years	3 times as likely in food-insufficient hh.					
	Children age 6-16 years	88 percent more likely in food-insufficient hh.					
Frequent headaches	Children age 4-5 years	2.5 times as likely in food-insufficient hh.					
	Children age 6-16 years	67 percent more likely in food-insufficient hh.					
Number of colds in previous 12 months	Children age 1-5 years	57 percent more in food-insufficient hh.					
	Children age 6-16 years	Moderately strong positive association in the sample, but not statistically significant.					
Number of ear infections in lifetime	Children age 1-5 years	Association weakly positive in sample, but not statistically significant.		NHANES III			Alaimo et al., 2001b
	Children age 6-16 years	Association weakly positive in sample, but not statistically significant.					
Iron deficiency	Children age 1-5 years	Association negative (opposite of expected) in sample, but not statistically significant.					
	Children age 6-16 years	Association negative (opposite of expected) in sample, but not statistically significant.					
Restrictive impairment (1-5 yrs., prevented usual activity; 6-16 yrs., prevented school attendance.)	Children age 1-5 years	Association positive in sample, but not statistically significant.					
	Children age 6-16 years	Association positive in sample, but not statistically significant.					
Cognitive development (two subtests of Weschler Intelligence Scale for Children-Revised)	Children age 6-11 years	No statistically significant association.	NHANES III			Alaimo et al., 2001a	
	Children age 12-16 years	No statistically significant association.					

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Appendix table B-1—Findings from selected studies on the effects of food insecurity and food insufficiency on children’s health, development, and well-being (statistically significant associations, with controls included in the model, are shaded)¹ (continued)

Condition studied	Population	Finding	Data ²	Comments	Citation
Academic development (two subtests of Wide Range Achievement Test-Revised, repeated grade, days absent)	Children age 6-11 years	Lower arithmetic score and more likely to have repeated a grade in food-insufficient hh.	NHANES III		Alaimo et al., 2001a
	Children age 12-16 years	No statistically significant association. Associations in sample weak and inconsistent.			
Psychosocial development (school absence, professional help for mental health, school suspension, number of good friends, trouble getting along with other children, shyness, or slow to make friends)	Children age 6-11 years	Child in food-insufficient hh 89 percent more likely to have seen psychologist or other mental health professional because of an emotional, mental, or behavioral problem.			
	Children age 6-11 years	Positive association with “difficulty getting along with others” in sample, but not statistically significant.			
	Children age 12-16 years	Child in food-insufficient hh 82 percent more likely to have seen psychologist or other mental health professional because of an emotional, mental, or behavioral problem, 95 percent more likely to have been suspended, 74 percent more likely to have difficulty getting along with others.			
Psychosocial dysfunction (based on Pediatric Symptom Checklist)	Children ages 6-12	Significantly more likely in households with hungry children. Aggression and anxiety components particularly strongly associated with hunger.		CCHIP ⁴ Pittsburgh area	

¹All studies controlled for income, employment, and other household characteristics likely to confound the relationships of interest.

²Data source abbreviations are as follows: ECLS-B, Early Childhood Longitudinal Study-Birth Cohort (National Center for Education Statistics); ECLS-K, Early Childhood Longitudinal Study-Kindergarten Cohort (National Center for Education Statistics); C-SNAP Children’s Sentinel Nutrition Assessment Program, renamed Children’s Healthwatch in 2009; Delta NIRI, Lower Mississippi Delta Nutrition Intervention Research Initiative (consortium of USDA’s Agriculture Research Service, several land-grant universities, and other institutions in the region); Fragile Families, The Fragile Families and Child Wellbeing Study (Princeton University); NHANES III, National Health and Nutrition Examination Survey III (National Center for Health Statistics).

³The Weinreb et al. (2002) study used a methodology developed by the Community Childhood Hunger Identification Project (CCHIP). The measure is closely related to the Children’s Food Security Scale based on the HFSSM, and includes many of the same items. Based on the number of food-insecure conditions reported, households are classified as no hunger, adult or moderate child hunger, or severe child hunger.

⁴The Kleinman et al. study used data from a Community Childhood Hunger Identification Project (CCHIP) survey in low-income areas of Pittsburgh and surrounding Allegheny County. Children’s food security status was measured by the same eight questions as in Weinreb et al. (2000; see footnote 3), but categories were labeled as not hungry, at risk for hunger, or hungry.

Appendix C. Incidence of food insecurity in selected subpopulations, 2006-07 average

Appendix table C-1 provides the statistics that are presented graphically in the main body of the report on food insecurity by selected household characteristics. Also included in appendix table C-1 are the corresponding statistics for the broader category of food insecurity that includes households with food insecurity among either adults or children.

For example, out of a total of 26.6 million two-parent households with children, about 2.7 million were food insecure, comprising 10.3 percent of all two-parent households with children and 44.3 percent of all food-insecure households with children. Children as well as adults were food insecure in about 1.4 million two-parent households (a subset of the 2.7 million that were food insecure), comprising 5.1 percent of two-parent households with children and 41.5 percent of all food-insecure households with children. Children experienced very low food security at times during the year in 102,000 two-parent households, comprising 0.4 percent of two-parent households with children and 37.6 percent of all households with very low food security among children. This is a more severely food-insecure subset of the households with food insecurity among children.

Appendix table C-1. Prevalence and distribution of food insecurity in households with children, by selected household characteristics, 2006-07 average

Characteristic	All food security statuses	Food-insecure households (food insecurity among adults or children)			Households with food insecurity among children (low or very low food security among children)			Households with very low food security among children		
	Number (000)	Number (000)	Prevalence (%)	Share (%)	Number (000)	Prevalence (%)	Share (%)	Number (000)	Prevalence (%)	Share (%)
All households with children	39,413	6,194	15.7	100.0	3,293	8.3	100.0	272	0.7	100.0
Household composition:										
Two-parent households	26,629	2,745	10.3	44.3	1,367	5.1	41.5	102	.4	37.6
Single-female-headed households	9,515	2,882	30.3	46.5	1,652	17.4	50.2	148	1.6	54.4
Single-male-headed households	2,619	457	17.5	7.4	220	8.4	6.7	19	.7	7.1
Other households with children	650	109	16.7	1.8	53	8.2	1.6	2	.3	.8
Race and Hispanic ethnicity: ¹										
White non-Hispanic	24,305	2,798	11.5	45.2	1,391	5.7	42.2	92	.4	33.7
Black non-Hispanic	5,509	1,440	26.1	23.3	775	14.1	23.5	76	1.4	28.0
Hispanic ²	7,053	1,678	23.8	27.1	980	13.9	29.8	89	1.3	32.7
Other non-Hispanic	2,545	277	10.9	4.5	146	5.7	4.4	15	.6	5.6
Annual household income:										
Below poverty line ³	5,362	2,326	43.4	37.6	1,357	25.3	41.2	119	2.2	43.8
100 to 130 percent of poverty line	1,857	656	35.3	10.6	345	18.6	10.5	31	1.7	11.4
130 to 185 percent of poverty line	4,313	1,055	24.5	17.0	535	12.4	16.3	44	1.0	16.3
Above 185 percent of poverty line	21,306	1,460	6.9	23.6	687	3.2	20.9	43	.2	15.7
Income not reported	6,575	698	10.6	11.3	368	5.6	11.2	35	.5	12.8
Residence relative to Metropolitan Statistical Area:										
In principal city of MSA ⁴	10,516	1,987	18.9	32.1	1,112	10.6	33.8	114	1.1	41.9
In suburbs or outlying areas of MSA ⁵	17,140	2,244	13.1	36.2	1,159	6.8	35.2	80	.5	29.4
In MSA, specific location not identified	5,455	852	15.6	13.7	440	8.1	13.4	42	.8	15.3
Not in MSA (i.e., nonmetropolitan)	6,303	1,111	17.6	17.9	582	9.2	17.7	36	.6	13.4

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Table C-1. Prevalence and distribution of food insecurity in households with children, by selected household characteristics, 2006-07 average (continued)

Characteristic	All food security statuses		Food-insecure households (food insecurity among adults or children)		Households with food insecurity among children (low or very low food security among children)			Households with very low food security among children		
	Number (000)	Number (000)	Prevalence (%)	Share (%)	Number (000)	Prevalence (%)	Share (%)	Number (000)	Prevalence (%)	Share (%)
Census Region:										
Northeast	7,067	975	13.8	15.7	549	7.8	16.7	46	0.6	16.9
Midwest	8,641	1,295	15.0	20.9	641	7.4	19.5	48	.6	17.6
South	14,473	2,533	17.5	40.9	1,349	9.3	41.0	97	.7	35.8
West	9,232	1,391	15.1	22.5	754	8.2	22.9	81	.9	29.7
Employment and labor force status of adults:										
One or more employed full-time	34,359	4,253	12.4	68.7	2,213	6.4	67.2	168	.5	61.9
Part-time, no full-time	1,993	631	31.7	10.2	344	17.3	10.4	22	1.1	8.2
Unemployed looking for work, none employed	954	450	47.2	7.3	226	23.7	6.9	35	3.6	12.7
Disabled, none in the labor force	871	455	52.2	7.3	270	31.0	8.2	26	3.0	9.7
None in labor force, none disabled	1,236	404	32.7	6.5	239	19.3	7.3	20	1.6	7.5
Education of most highly educated adult:										
Less than high school	3,132	1,122	35.8	18.1	688	21.9	20.9	65	2.1	23.7
Completed high school (or GED)	9,339	2,153	23.1	34.8	1,126	12.1	34.2	97	1.0	35.8
Some college (including 2-year degree)	12,244	2,178	17.8	35.2	1,143	9.3	34.7	84	.7	30.8
Four-year degree or higher	14,699	740	5.0	11.9	335	2.3	10.2	26	.2	9.7
Age of oldest child in the household:										
0-4 years	7,569	1,029	13.6	16.6	397	5.2	12.1	24	.3	8.9
5-8 years	6,923	1,143	16.5	18.5	554	8.0	16.8	17	.2	6.2
9-12 years	8,614	1,346	15.6	21.7	769	8.9	23.3	59	.7	21.7
13-15 years	8,589	1,451	16.9	23.4	866	10.1	26.3	92	1.1	33.7
16-17 years	7,719	1,225	15.9	19.8	707	9.2	21.5	80	1.0	29.6

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Table C-1. Prevalence and distribution of food insecurity in households with children, by selected household characteristics, 2006-07 average (continued)

Characteristic	All food security statuses		Food-insecure households (food insecurity among adults or children)		Households with food insecurity among children (low or very low food security among children)			Households with very low food security among children		
	Number (000)	Number (000)	Prevalence (%)	Share (%)	Number (000)	Prevalence (%)	Share (%)	Number (000)	Prevalence (%)	Share (%)
Number of children in the household:										
1 child	16,999	2,389	14.1	38.6	1,156	6.8	35.1	133	0.8	49.0
2 children	14,300	2,073	14.5	33.5	1,137	8.0	34.5	56	.4	20.7
3 or more children	8,114	1,731	21.3	27.9	999	12.3	30.3	82	1.0	30.3

Note: For each characteristic and food security status, "prevalence" means the number of households with the specified food security status and the specified characteristic as a percentage of all households with the specified characteristic. "Share" means the number of households with the specified food security status and the specified characteristic as a percentage of all households with the specified food security status. For example, 10.3 percent of two-parent households were food insecure, and two-parent households made up 44.3 percent of all food-insecure households.

¹ Race and Hispanic ethnicity is that of the household reference person, i.e., the person in whose name the residence is owned or rented. If residence is jointly owned or rented, any of the owners or lessees may be designated reference person.

² Hispanics may be of any race.

³ The poverty line for a family of two adults and two children in 2007 was an annual income of \$21,027.

⁴ Households within incorporated areas of the largest cities in each metropolitan area.

⁵ Households in counties (townships in New England) that are densely populated and linked to principal cities of the MSA by daily commuting patterns.

Source: Calculated by Economic Research Service using Current Population Survey Food Security Supplement data.