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## Measuring Food Security in the United States

# Prevalence of Food Insecurity and Hunger, by State, 1996-1998

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### Abstract

Although most households in the United States are food secure, during the period 1996-98 some 10 million U.S. households (9.7 percent of total) were food insecure--that is, they did not always have access to enough food to meet basic needs. Included among these were 3.5 percent of households in which food insecurity was severe enough that one or more household members were hungry at least some time during the year due to inadequate resources for food. The prevalence of food insecurity and hunger varied considerably among States. Eleven States, located in an arc along the western and southern borders of the country, and the District of Columbia, had rates of food insecurity significantly above the national average. By contrast, 20 States--most of them in the Midwest, Great Lakes, and Northeast--had rates of food insecurity significantly below the national average. High-food-insecurity States generally had higher than average poverty rates and higher than average use of food stamps, but there were some notable exceptions.

**Keywords:** Food security, food insecurity, hunger

**Related USDA publications in the series, *Measuring Food Security in the United States*:**

*Household Food Security in the United States in 1995: Summary Report of the Food Security Measurement Project*, by William Hamilton et al. Office of Analysis, Nutrition, and Evaluation, Food and Nutrition Service, U.S. Department of Agriculture.

*Household Food Security in the United States, 1995-1998: Advance Report*, by Gary Bickel, Steven Carlson, and Mark Nord. Office of Analysis, Nutrition, and Evaluation, Food and Nutrition Service, U.S. Department of Agriculture.

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# Prevalence of Food Insecurity and Hunger, by State, 1996-1998

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## Introduction

The long-running expansion of the U.S. economy and the continuing strength of the Nation's nutrition safety net have helped a large majority of American households achieve or maintain food security. On average during the 3-year period ending in August 1998, more than 90 percent of U.S. households were food secure. That is, they had assured access at all times to enough food for an active healthy life, with no need for recourse to emergency food sources or other extraordinary coping behaviors to meet their basic food needs.

At the same time, 9.7 percent of U.S. households--about 10 million households each year--were food insecure, meaning that they did not have this same assured access to enough food to fully meet basic needs at all times. Included among these were 3.5 percent of households in which food insecurity reached levels of severity

great enough that one or more household members were hungry at least some time during the year due to inadequate resources for food.

This report presents estimates of prevalence rates of food insecurity and hunger for each State and assesses the extent to which these prevalences vary among the States. Summary information about food insecurity and hunger at the national level and for major subpopulations is provided in *Household Food Security in the United States, 1995-1998 (Advance Report)*, available from the United States Department of Agriculture, Food and Nutrition Service.

There are several reasons for interest in the State-level prevalence of food insecurity and hunger. Many of the efforts that comprise the national nutrition safety net are carried out at State and local levels. State governments play a major role

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in administering national programs such as the Food Stamp Program, WIC (Special Supplemental Nutrition Program for Women, Infants, and Children), and the School Lunch and School Breakfast Programs, and these programs are implemented at the local level. Most private sector emergency food programs, such as food banks, emergency feeding centers, and food pantries, are regional or local in character. Other public programs that affect food security, such as cash welfare assistance programs, also are State programs, and this is increasingly true following recent changes in the welfare system. The prevalence of food insecurity and hunger in the State can provide important information to help in assessing and improving these programs.

In addition to these programmatic reasons for interest in State-level food security, variations in food security across States may also provide

clues as to factors that affect households' food security, or that distort the measure used to assess food security. In this report, State rates of food insecurity are compared with State poverty rates and food stamp use rates. These comparisons provide a preliminary look at associations of food insecurity with economic well-being and with use of a major component of the national nutrition safety net.

The State estimates reported here are based on averages from three annual national surveys, covering the 3 years ending in August 1998 (see Appendix A, "Measuring Food Security"). The number of households surveyed each year, while large enough for reliable national estimates, is too small for estimates for most States, so 3 years of data are combined to obtain improved levels of reliability.

**What is Food Security?**  
**Definitions from the Life Sciences Research Office**  
(Anderson 1990)

**Food security** -- Access by all people at all times to enough food for an active, healthy life. Food security includes at a minimum: (1) the ready availability of nutritionally adequate and safe foods, and (2) an assured ability to acquire acceptable foods in socially acceptable ways....

**Food insecurity** -- Limited or uncertain availability of nutritionally adequate and safe foods or limited or uncertain ability to acquire acceptable foods in socially acceptable ways.

**Hunger** -- The uneasy or painful sensation caused by a lack of food. The recurrent and involuntary lack of access to food.

Table 1. State prevalence rates of food insecurity and hunger, average 1996-98

State	Food insecure (% of households)	Margin of error* (percentage points)	Food insecure with hunger (% of households)	Margin of error* (percentage points)
US average	9.7	0.18	3.5	0.14
AK	7.6	1.73	3.5	0.88
AL	11.3	1.58	3.2	0.71
AR	12.6	1.34	4.6	0.58
AZ	12.8	2.06	4.2	0.71
CA	11.4	0.67	4.1	0.54
CO	8.8	1.01	3.4	0.59
CT	8.8	1.92	3.8	1.40
DC	11.1	1.31	4.6	0.91
DE	6.8	1.11	2.6	0.91
FL	11.5	0.87	4.2	0.52
GA	9.7	1.65	3.2	0.86
HI	10.4	1.25	2.8	0.90
IA	7.0	0.93	2.5	0.59
ID	10.1	1.17	3.3	0.65
IL	8.2	0.53	3.1	0.41
IN	7.8	1.26	2.8	0.66
KS	9.9	1.42	4.0	0.90
KY	8.4	0.91	3.2	0.61
LA	12.8	1.88	4.4	1.13
MA	6.3	0.83	2.0	0.51
MD	7.1	1.34	3.0	0.88
ME	8.7	1.55	3.7	0.82
MI	8.1	0.92	2.9	0.44
MN	6.9	1.06	2.9	0.59
MO	8.6	1.26	2.9	0.71
MS	14.0	1.82	4.2	0.91
MT	10.2	1.30	3.0	0.61
NC	8.8	1.07	2.6	0.43
ND	4.6	0.65	1.4	0.54
NE	7.5	1.31	2.4	0.61
NH	7.4	1.36	2.9	0.75
NJ	7.3	0.83	2.8	0.47
NM	15.1	1.81	4.7	0.67
NV	8.6	1.63	3.7	0.98
NY	10.0	0.74	3.9	0.31
OH	8.5	0.85	3.4	0.41
OK	11.9	1.47	4.2	0.79
OR	12.6	1.90	5.8	1.00
PA	7.1	0.58	2.3	0.34
RI	8.7	1.22	2.6	0.74
SC	10.2	1.59	3.4	0.89
SD	6.4	1.09	2.1	0.59
TN	10.9	1.32	4.3	1.08
TX	12.9	0.81	5.0	0.59
UT	8.8	1.42	3.1	0.84
VA	8.3	0.91	2.9	0.75
VT	7.7	1.19	2.6	0.67
WA	11.9	1.42	4.6	0.97
WI	7.2	1.09	2.3	0.61
WV	9.0	1.08	3.1	0.62
WY	9.0	1.42	3.3	0.75

\*Margins of error at 90% confidence level.

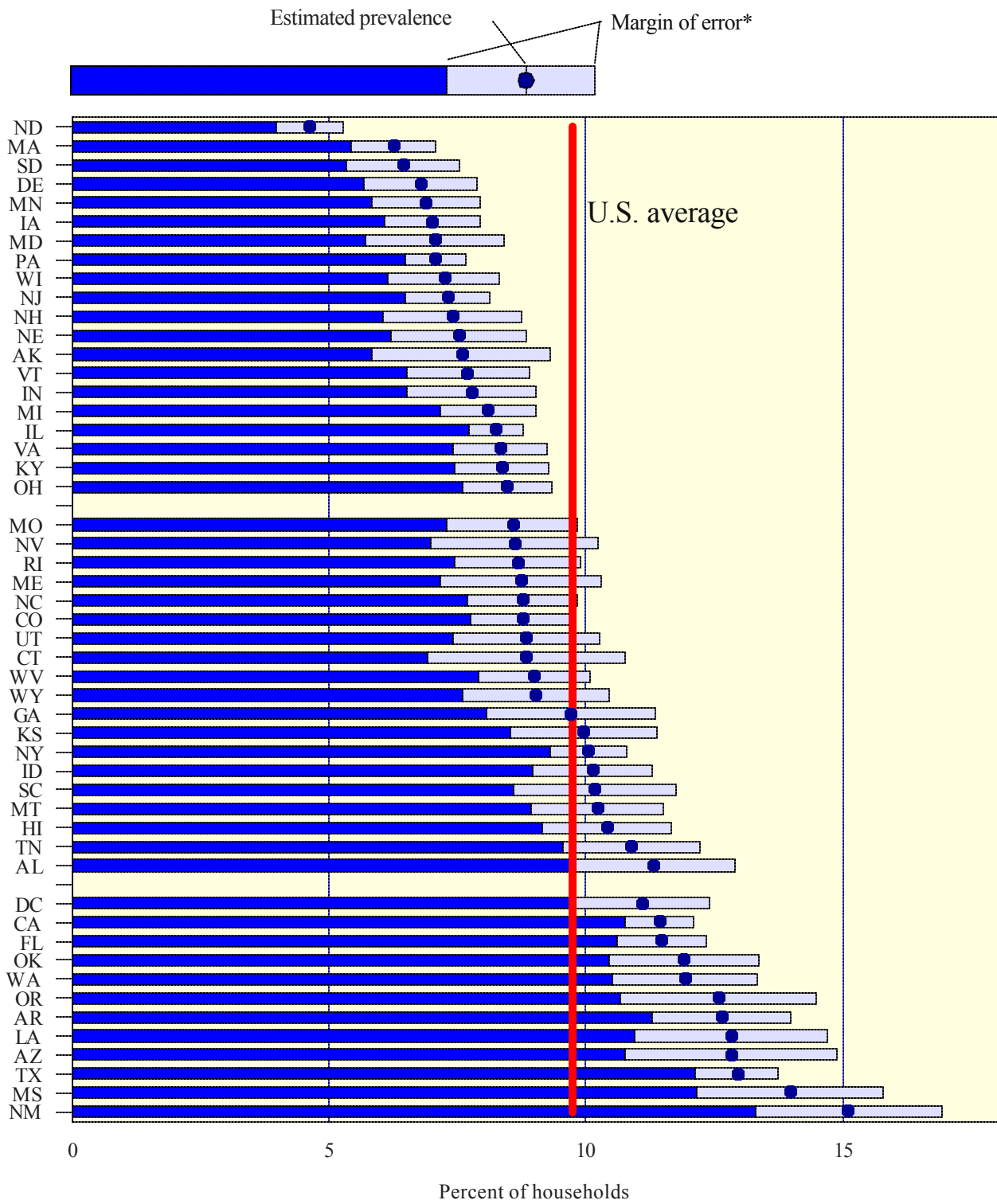
Source: Calculated by ERS based on Current Population Survey Food Security Supplement data, September 1996, April 1997, and August 1998.

## Prevalence of Food Insecurity, by State

The prevalence of food insecurity ranged from a low of 4.6 percent of households in North Dakota to a high of 15.1 percent in New Mexico (table 1 and figure 1). These estimates have margins of error of up to 2 percentage points due to limited sample sizes. The margins of error are depicted in figure 1 as gray areas above and below the estimated prevalence. Allowing for the margins of error, the prevalence of food

insecurity was below the national rate in 20 States and above the national rate in 11 States and the District of Columbia. In the remaining 19 States (Missouri through Alabama in figure 1), the margins of error extended both above and below the national average. For these States, the observed differences from the national average are not statistically significant.

**Figure 1.**  
**Prevalence of food insecurity, by State, average 1996-1998**



\*Margin of error with 90% confidence

Source: Calculated by ERS based on Current Population Survey Food Security Supplement data, September 1996, April 1997, and August 1998.

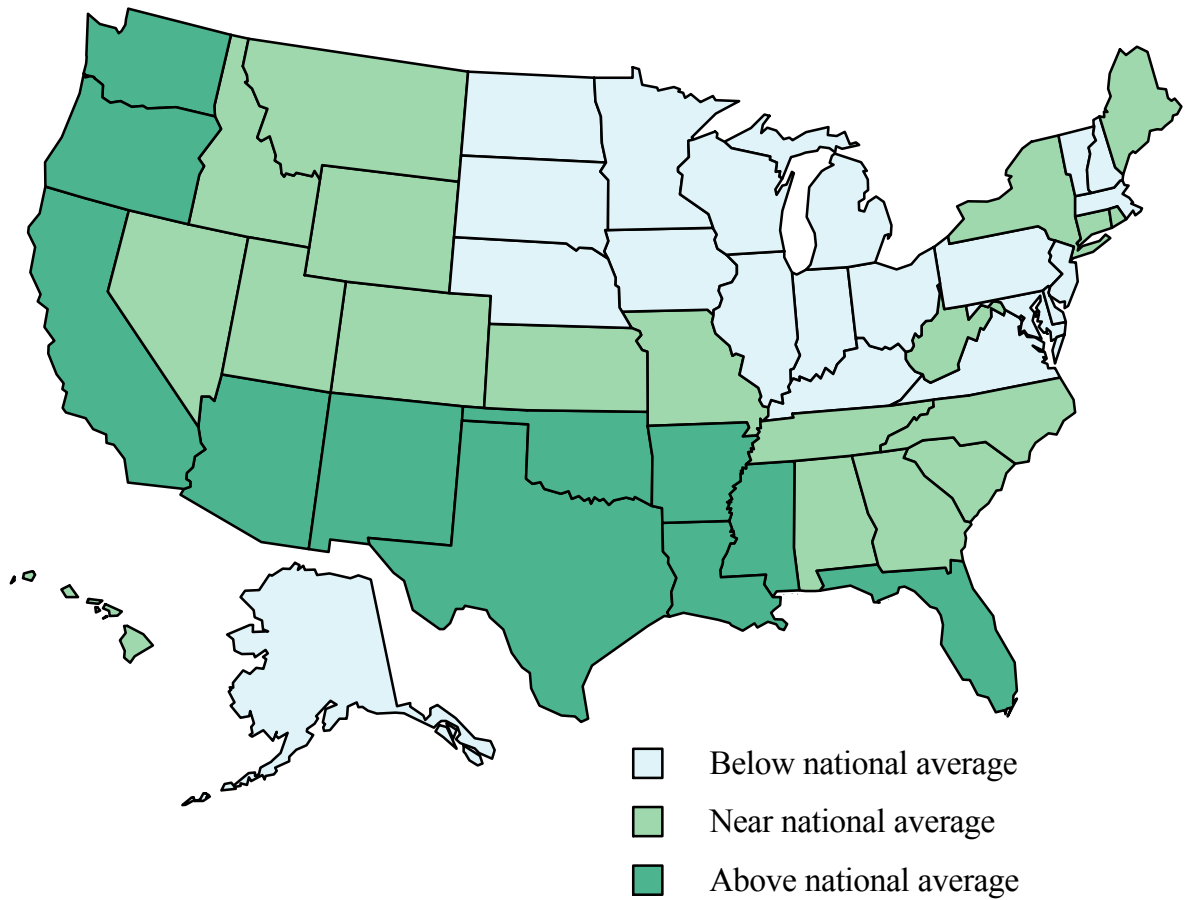


## **Geographic Distribution of Food Insecurity**

The prevalence of food insecurity in the United States follows a discernible geographic pattern (fig. 2). States with the highest rates of food insecurity form a nearly continuous arc bordering the Pacific Ocean, Mexico, and the Gulf of Mexico. Those with rates below the national average are in a nearly contiguous band extending eastward from the Dakotas and

Nebraska, across the Great Lakes and the upper Ohio River Valley to the Atlantic Coast (except West Virginia, New York, and parts of New England). Some aspects of this geographic pattern are unexpected, and further research will be needed to understand the factors that produce it.

**Figure 2.**  
**Prevalence of food insecurity, average 1996-1998**



Source: Calculated by ERS based on Current Population Survey Food Security Supplement data, September 1996, April 1997, and August 1998.

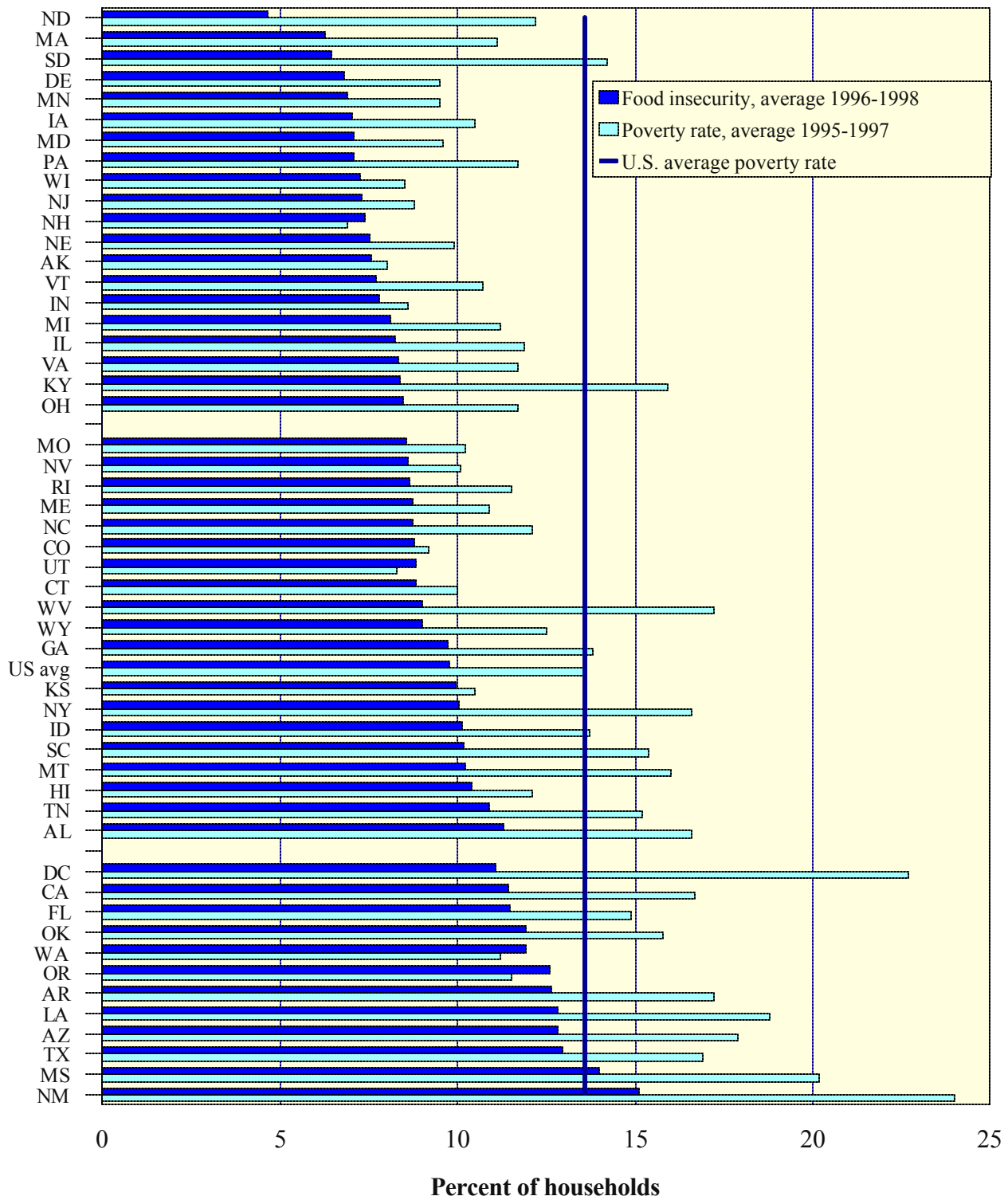
## Food Insecurity and Poverty

Food insecurity is closely linked with poverty, and this association is apparent when State poverty rates are compared with State rates of food insecurity (fig. 3). The association is far from perfect, however, and for some States the differences are substantial and unexpected. At the national level, the most recent 3-year average poverty rate was 13.6 percent, compared with the 9.7 percent prevalence of food insecurity.

Poverty rates were below the national average in 18 of the 20 States with low rates of food insecurity (North Dakota through Ohio in figure 3). The exceptions were Kentucky and South Dakota, with poverty rates of 15.9 percent and 14.2 percent, respectively. The reliability of the estimates of food insecurity for these States is similar to that of other States (table 1), and examination of separate years' statistics (see appendix table B-1) confirms that Kentucky and South Dakota registered prevalences of food insecurity below the national average in all 3 years. Low costs of housing in these States may be part of the reason for their relatively low rates of food insecurity.

Similarly, poverty rates were above the national average in all but 2 of the 11 high-food-insecurity States (California through New Mexico in figure 3) and in the District of Columbia. The exceptions are quite remarkable, however. Washington and Oregon had poverty rates more than two percentage points below the national average, yet registered prevalences of food insecurity of 11.9 percent and 12.6 percent respectively--well above the national average. The reliability of the food insecurity estimates for these States is similar to that of other States (table 1), and they registered high prevalences of food insecurity in all 3 years (see appendix table B-1). The prevalence of food insecurity in Washington and Oregon was also high in 1995, the first year the Food Security Supplement was fielded (see *Household Food Security in the United States in 1995: Summary Report*, available from the Food and Nutrition Service). At present, reasons for these unexpected high rates of food insecurity in the Pacific Northwest are not known, and further research is needed on this subject.

**Figure 3.**  
**Prevalence of food insecurity compared with poverty rate, by State**



Source: Food insecurity prevalences calculated by ERS based on Current Population Survey Food Security Supplement data, September 1996, April 1997, and August 1998. Poverty rates from Census Bureau "Poverty in the United States: 1997, P-60-201."

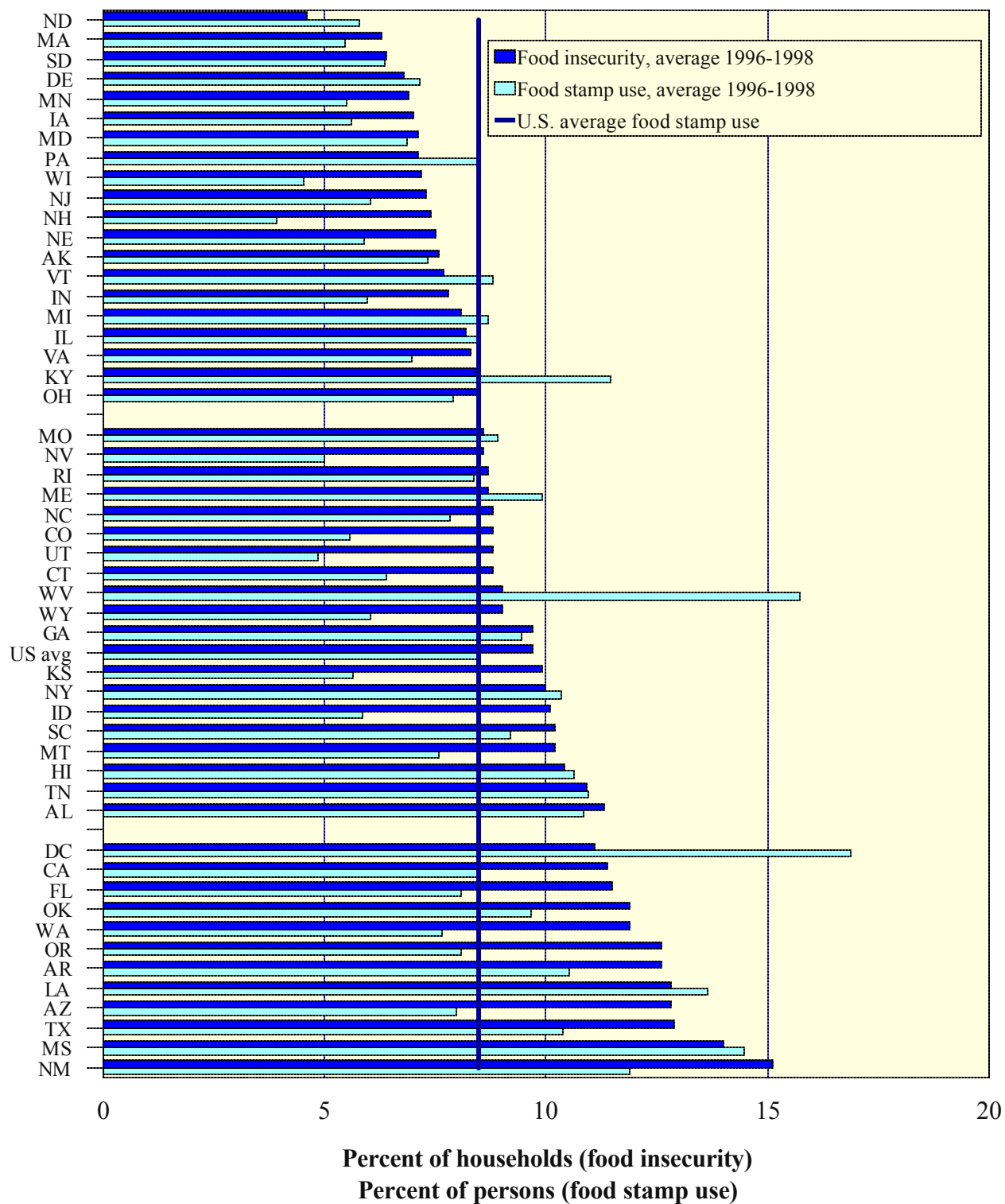
## Food Insecurity and Food Stamp Use

The proportion of a State's population that receives food stamps is also expected to be associated with the prevalence of food insecurity. Food-insecure households are more likely than other households to have low income and thus to be eligible for food stamps. Further, among eligible households, those that are food insecure are more likely to apply for food stamps.

The expected association holds, in general, for the State-level rates reported here, but again there are some notable exceptions. All but three of the 20 States with food insecurity rates below the national average also had food stamp use rates below the national average (fig. 4), the exceptions being Vermont, Michigan, and Kentucky. The association between food stamp use and food insecurity was not as strong among

high-food-insecurity States, however. Of the 11 States and the District of Columbia that had food insecurity rates above the national average, only 7 States and the District of Columbia had food stamp use rates above the national average. The food stamp use rates in Florida, Washington, Oregon, and Arizona, on the other hand, fell far below the food insecurity rates of those States. This pattern was also observed in a number of States with food insecurity rates near the national average, most notably Nevada, Colorado, Utah, Wyoming, Kansas, and Idaho. Further research is needed to investigate the extent to which these departures from expectations represent significant underserved populations, and to what extent they point to problems with the food security measurement methods.

**Figure 4.**  
**Prevalence of food insecurity compared with food stamp use, by State**



Source: Calculated by ERS based on Current Population Survey Food Security Supplement data, September 1996, April 1997, and August 1998, and Food Stamp Program administrative data.

## **Prevalence of Hunger, by State**

The prevalence of hunger ranged from 1.4 percent of households in North Dakota to 5.8 percent in Oregon (table 1 and figure 5). The prevalences of food insecurity and hunger are strongly associated, and the rankings of States on the two variables are very similar. Allowing for

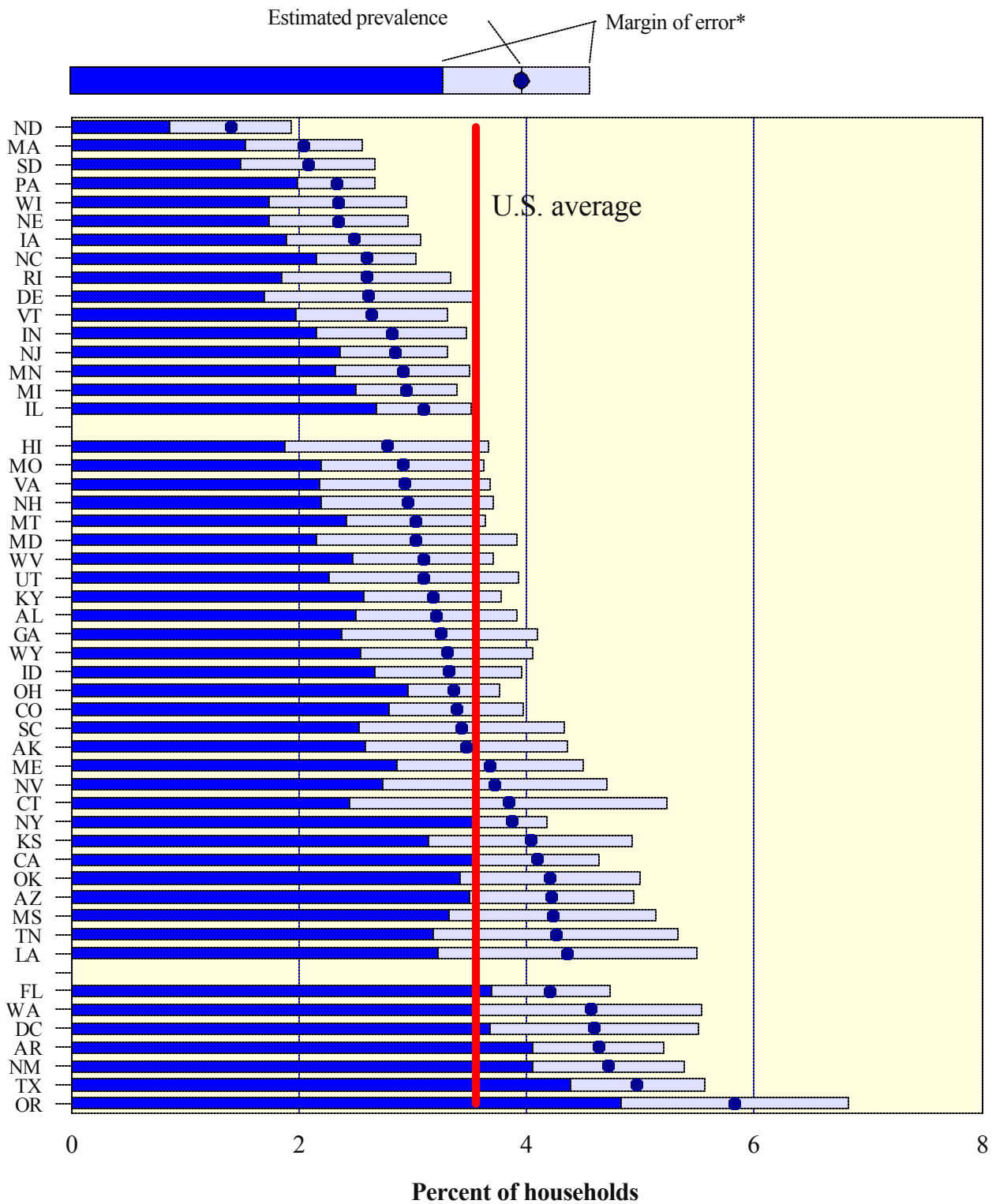
margins of error in the estimates, the prevalence of hunger was below the national rate in 16 States and above the national rate in 6 States and the District of Columbia. In the remaining 28 States, the observed differences from the national average were not statistically significant.

## **Concluding Comments**

Rates of food insecurity and hunger vary substantially among States. State-level associations with poverty and food stamp participation are generally in accordance with expectations, but there are some surprising exceptions which, along with the unexplained geographic pattern of the prevalence of food

insecurity, require further analysis. The findings described in this paper, along with further State-level analysis, may suggest fruitful directions for research on State-, regional-, and household-level determinants of food insecurity and hunger, as well as research on the methods by which these phenomena are measured.

**Figure 5.**  
**Prevalence of hunger, by State, average 1996-1998**



\*Margin of error with 90% confidence

Source: Calculated by ERS based on Current Population Survey Food Security Supplement data, September 1996, April 1997, and August 1998.



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Additional information is available on the web. Visit the Economic Research Service Food Security Briefing Room at: <http://www.econ.ag.gov/briefing/FoodSecurity/>

## Appendix A

### Measuring Food Security

The Federal food security measure was developed through a collaborative process between private non-government experts, academic researchers, and a Federal interagency working group, with leadership from the Department of Agriculture and the Department of Health and Human Services. The severity of food insecurity and hunger in households is measured through a series of questions about experiences and behaviors known to characterize households that are having difficulty meeting basic food needs. These experiences and behaviors generally occur in an ordered sequence as the severity of food insecurity increases. As resources become more constrained, adults in typical households first worry about having enough food, then they stretch household resources and juggle other necessities, then decrease the quality and variety of household members' diets, then decrease the frequency and quantity of adults' food intake, and finally decrease the frequency and quantity of children's food intake. All questions refer to the previous 12 months and include a qualifying phrase reminding respondents to report only those occurrences that resulted from inadequate financial resources. Restrictions to food intake due to dieting or busy schedules are excluded. Examples of questions across the range are:

[Light end of scale]

*"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?*

*"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?*

[Middle of scale]

*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?*

*In the last 12 months, were you ever hungry but didn't eat because you couldn't afford enough food?*

[Severe end of scale]

*In the last 12 months did you or other adults in the household ever not eat for a whole day because there wasn't enough money for food?*

(For households with children) *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?*

The questions in the food security scale are administered annually to a nationally representative sample of households, as a supplement to the Current Population Survey, the Nation's major monthly labor force survey. Analysis by USDA and private researchers has produced a standardized methodology for scaling a set of 18 of these questions to provide a detailed, validated measure of the severity of food insecurity and hunger in each household. Households are categorized, based on their score on this scale, into meaningful food security status categories: food secure, food insecure without hunger, food insecure with hunger. The proportions of households in these categories are then used to estimate the prevalences of food security, food insecurity, and hunger at the national and State levels and for major population subgroups.

The core food security module questionnaire and the full Current Population Survey Food Security Supplement questionnaire are available from the Economic Research Service Food Security Briefing Room on the web: <http://www.econ.ag.gov/briefing/FoodSecurity/>

## **Appendix B Data and Methods**

### ***Data Source***

Data on food security are from the Current Population Survey Food Security Supplements of September 1996, April 1997, and August 1998. The Current Population Survey (CPS) is the major national labor force survey of U.S. households. It is carried out by the Census Bureau for the Bureau of Labor Statistics and includes a national probability sample of about 50,000 households each month. The Food Security Supplement, sponsored by USDA, has been included with the CPS once each year since 1995, alternating between April and September or August. The Food Security Supplement data files used for the present analysis will be available from the Census Bureau in late 1999.

### ***Screening***

The Food Security Supplements use one or more screens to reduce respondent burden. Households that are screened out after a few initial questions are skipped over the remaining questions and classified as food secure. In the early years of the survey, however, the screening rules changed somewhat from year to year. Consequently, some households were screened out in one year while, in other years, households with the same responses to the initial questions were asked the full battery of items. Some of these households affirmed enough items to be classified as food insecure (or, in a few cases, even as food insecure with hunger). Thus, differences in screening affected the measured prevalence of food insecurity, and this effect varied among years. The statistics presented here are adjusted to a “common screen” for the years 1995, 1996, 1997, and 1998. Under this procedure, each year’s data are recoded so that households that would have been screened out in any of the four years are classified as food secure without reference to their actual responses. This assures maximum comparability

across years, although at some cost in sensitivity. A detailed discussion of screening and adjustments to assure comparability will be included in the full report on the 1995 through 1997 Food Security Supplements, forthcoming from the Food and Nutrition Service.

### ***Weighting and Prevalence Estimation***

All prevalence calculations use household weights adjusted for supplement non-response so the sample households represent the total national noninstitutionalized population.

Annual prevalence estimates of food insecurity and hunger for States have rather large margins of error because of the limited number of households surveyed in each State. To obtain estimates of acceptable reliability, data were pooled across 3 years, following the practice of the Census Bureau in its State-level estimates of poverty rates. Prevalence rates were calculated for each year and then the 3 years’ prevalences were averaged.

Prevalence rates for each of the 3 years are presented in table B-1. For most States, prevalence rates were similar in the 3 years, with prevalences in 1997 somewhat lower than those in 1996 and 1998, as was true at the national level. There were substantial inter-year differences for some States, but these are not surprising given the rather large expected variation due to sampling error. Care should be exercised in assessing trends over time for individual States. The margin of error for a single year’s estimated prevalence is about 1.73 times that for the 3-year average reported in table 1.

A very small number of households did not respond to any of the 18 items used to calculate

Appendix table B-1. Annual estimates of State rates of food insecurity and hunger						
State	Food insecure (with or without hunger)			Food insecure with hunger		
	1996	1997	1998	1996	1997	1998
	Percent of households					
US average	10.4	8.7	10.1	4.1	3.1	3.5
AK	7.5	9.3	6.0	3.6	3.9	2.9
AL	12.7	10.5	10.7	4.4	3.3	2.0
AR	13.8	12.3	11.7	6.3	4.9	2.7
AZ	13.1	11.0	14.4	4.9	3.9	3.8
CA	12.6	9.5	12.2	5.1	3.0	4.1
CO	10.2	8.1	8.0	4.8	3.0	2.3
CT	8.7	9.2	8.6	4.0	4.5	3.0
DC	10.4	11.1	11.8	5.0	3.9	4.8
DE	6.1	6.2	8.1	3.1	1.1	3.7
FL	13.4	9.6	11.4	5.2	3.5	3.9
GA	11.3	8.2	9.6	4.3	1.8	3.5
HI	11.2	8.3	11.7	3.1	2.3	2.9
IA	6.9	6.8	7.3	2.3	3.1	2.0
ID	11.5	8.6	10.3	4.4	2.0	3.5
IL	9.6	7.2	8.0	3.8	2.5	2.9
IN	6.6	9.2	7.5	2.8	2.6	3.0
KS	10.4	10.4	9.0	3.9	4.2	4.0
KY	9.2	6.8	9.1	3.3	2.6	3.6
LA	13.3	10.4	14.8	3.8	3.6	5.7
MA	4.8	6.4	7.6	1.5	1.6	2.9
MD	8.3	6.6	6.3	3.6	2.6	2.9
ME	8.2	8.7	9.3	3.9	3.8	3.3
MI	9.1	7.7	7.5	4.0	2.7	2.0
MN	7.0	7.0	6.7	3.1	3.3	2.3
MO	9.6	7.8	8.3	3.3	2.9	2.6
MS	17.2	11.4	13.4	6.5	3.3	2.9
MT	9.1	10.1	11.5	2.4	3.2	3.5
NC	11.1	7.2	8.0	4.2	1.7	1.8
ND	4.0	3.5	6.4	1.2	1.1	1.8
NE	8.0	7.0	7.5	2.2	2.3	2.6
NH	7.6	6.1	8.4	3.6	2.0	3.3
NJ	6.4	6.5	9.0	3.0	2.1	3.3
NM	17.0	12.3	16.0	5.2	3.7	5.3
NV	9.3	7.3	9.3	4.6	2.5	4.0
NY	9.5	9.9	10.7	3.8	4.2	3.7
OH	9.5	7.9	8.0	3.9	3.1	3.1
OK	11.7	9.3	14.7	5.4	2.3	5.0
OR	11.4	10.8	15.6	6.2	4.4	6.8
PA	7.1	6.6	7.5	2.5	2.1	2.4
RI	10.9	6.5	8.6	3.6	1.2	3.0
SC	11.2	10.0	9.3	3.4	2.9	4.0
SD	6.8	4.7	7.8	1.9	1.5	2.8
TN	9.8	10.1	12.8	3.8	3.8	5.2
TX	13.3	12.0	13.6	5.6	4.0	5.3
UT	10.5	6.0	10.0	4.0	1.4	3.9
VA	9.9	7.9	7.1	2.8	3.4	2.7
VT	8.1	5.5	9.5	3.0	1.2	3.7
WA	12.6	10.6	12.5	4.6	4.1	5.0
WI	7.8	6.2	7.8	2.2	3.1	1.7
WV	10.8	6.3	9.8	4.0	2.0	3.3
WY	8.9	9.1	9.1	3.4	4.1	2.5

Note: Care should be exercised in assessing trends over time for individual States. The margin of error for a single year's estimated prevalence is about 1.73 times that for the 3-year average reported in table 1.

Source: Calculated by ERS based on Current Population Survey Food Security Supplement data, September 1996, April 1997, and August 1998.

the food security scale, although they did respond to at least some other questions in the supplement (and therefore have supplement weights). These households have missing scale scores and were excluded from the denominators in calculating prevalence rates.

### ***Variance Calculation***

Even with 3 years of data, State prevalence estimates have sizeable margins of error. Estimates of these margins of error are presented with the prevalence estimates to remind readers of this level of uncertainty. The margins of error presented in this report are 90-percent confidence intervals based on variances estimated using a jackknife replication procedure. The 8 CPS month-in-sample (MIS) groups were used as independent replication samples. Variances were calculated independently for each year in each State, because actual prevalences in each State were expected to vary from year to year. The variance of the 3-year average prevalence estimate was then calculated as the average of the three 1-year variances divided by 3.

An alternative methodology was explored, which used the general variance estimation procedures (GVE) published by the Census Bureau in the “Source and Accuracy Statement” for the monthly labor force and March Annual Demographic microdata files. The value for the “b” parameter for household poverty estimates in the March file (2,442) was used, with adjustments for the somewhat smaller sample in months other than March, and for the proportion of households in the monthly labor force surveys that did not complete the Food Security Supplements. On average, the GVE-based standard errors were about 7 percent smaller than those based on the replication method, and the differences between the two varied considerably from State to State. However, the statistical significance of the differences between State and national estimates was affected for only two States at the insecurity threshold and three States at the hunger threshold. The replication-based variance estimates are reported here both because they are generally more conservative, and because they take into account the measurement error in assigning food security status to households.