

Appendix B—Background on the U.S. Food Security Measurement Project

This report of household food security in 2007 is the latest in a series of reports on *Measuring Food Security in the United States*. Previous reports in the series are:

- *Household Food Security in the United States in 1995: Summary Report of the Food Security Measurement Project* (Hamilton et al., 1997a)
- *Household Food Security in the United States in 1995: Technical Report* (Hamilton et al., 1997b)
- *Household Food Security in the United States, 1995-1998: Advance Report* (Bickel et al., 1999)
- *Prevalence of Food Insecurity and Hunger, by State, 1996-1998* (Nord et al., 1999)
- *Guide to Measuring Household Food Security, Revised 2000* (Bickel et al., 2000)
- *Household Food Security in the United States, 1999* (Andrews et al., 2000)
- *Household Food Security in the United States, 1995-1997: Technical Issues and Statistical Report* (Ohls et al., 2001)
- *Household Food Security in the United States, 1998 and 1999: Detailed Statistical Report* (Cohen et al., 2002b)
- *Household Food Security in the United States, 1998 and 1999: Technical Report* (Cohen et al., 2002a)
- *Household Food Security in the United States, 2000* (Nord et al., 2002b)
- *Measuring Children's Food Security in U.S. Households, 1995-99* (Nord and Bickel, 2002)
- *Household Food Security in the United States, 2001* (Nord et al., 2002a)
- *A 30-Day Food Security Scale for Current Population Survey Food Security Supplement Data* (Nord 2002)
- *Household Food Security in the United States, 2002* (Nord et al., 2003)
- *Household Food Security in the United States, 2003* (Nord et al., 2004)
- *Household Food Security in the United States, 2004* (Nord et al., 2005)
- *Household Food Security in the United States, 2005* (Nord et al., 2006)
- *Household Food Security in the United States, 2006* (Nord et al., 2007)

The series was inaugurated in September 1997 with the three-volume report, *Household Food Security in the United States in 1995* (Hamilton et al., 1997a and 1997b, Price et al., 1997). The advance report of findings for 1995-98 (Bickel, Carlson, and Nord, 1999) was released in July 1999, and a report detailing prevalence rates of food insecurity by State for the 1996-98 period (Nord, Jemison, and Bickel, 1999) was released in September 1999. Summary reports of findings for 1999 (Andrews et al., 2000), 2000 (Nord

et al., 2002b), 2001 (Nord et al., 2002a), 2002 (Nord et al., 2003), and 2003 (Nord et al., 2004) continued the national report series and expanded its scope. Detailed statistical reports for 1995-97 (Ohls et al., 2001) and for 1998-99 (Cohen et al., 2002b) provided additional prevalence statistics along with standard errors for prevalence estimates and explored technical issues in food security measurement.

The estimates contained in all of these reports are based on a direct survey measure developed over several years by the U.S. Food Security Measurement Project, an ongoing collaboration among Federal agencies, academic researchers, and both commercial and nonprofit private organizations (Carlson et al., 1999; Olson, 1999.) The measure was developed in response to the National Nutrition Monitoring and Related Research Act of 1990. The Ten-Year Comprehensive Plan developed under the Act specified the following task:

Recommend a standardized mechanism and instrument(s) for defining and obtaining data on the prevalence of “food insecurity” or “food insufficiency” in the U.S. and methodologies that can be used across the NNMRR Program and at State and local levels.¹

Beginning in 1992, USDA staff reviewed the existing research literature, focusing on the conceptual basis for measuring the severity of food insecurity and hunger and on the practical problems of developing a survey instrument for use in sample surveys at national, State, and local levels.

In January 1994, USDA’s Food and Nutrition Service (FNS) joined with the U.S. Department of Health and Human Services’ National Center for Health Statistics (NCHS), in sponsoring a National Conference on Food Security Measurement and Research. This meeting brought together leading academic experts and other private researchers and key staff of the concerned Federal agencies. The conference identified the consensus among researchers in the field as to the strongest conceptual basis for a national measure of food insecurity and hunger. It also led to a working agreement about the best method for implementing such a measure in national surveys (USDA, 1995).

After extensive cognitive assessment, field testing, and analysis by the U.S. Census Bureau, a food security survey questionnaire was fielded by the bureau as a supplement to the Current Population Survey (CPS) of April 1995.² The CPS food security survey was repeated in September 1996, April 1997, August 1998, April 1999, September 2000, April 2001, and December of 2001 and later years. Minor modifications to the questionnaire format and screening procedures were made over the first several years, and a more substantial revision in screening and format, designed to reduce respondent burden and improve data quality, was introduced with the August 1998 survey. However, the content of the 18 questions upon which the U.S. Food Security Scale is based remained constant in all years.³

Initial analysis of the 1995 data was undertaken by Abt Associates, Inc., through a cooperative venture with FNS, the interagency working group, and other key researchers involved in developing the questionnaire. The Abt team used nonlinear factor analysis and other state-of-the-art scaling methods to produce a measurement scale for the severity of deprivation

¹Task V-C-2.4, U.S. Department of Health and Human Services and U.S. Department of Agriculture: Ten-Year Comprehensive Plan for the National Nutrition Monitoring and Related Research Program. *Federal Register* 1993, 58:32 752-806.

²The Current Population Survey (CPS) is a representative national sample of approximately 60,000 households conducted monthly by the U.S. Census Bureau for the U.S. Department of Labor, Bureau of Labor Statistics. Its primary purpose is to monitor labor force participation and employment in the United States and each of the 50 States. Various Federal agencies sponsor collection of specialized supplementary data by the CPS following the labor-force interview. The CPS food security survey has been conducted annually since 1995 as one such CPS supplement, sponsored by USDA. From 1995 to 2000 the food security survey alternated between April and August/September; beginning in 2001, it has been conducted in early December.

³In some years, alternative wording of some questions was tested in one-eighth of the sample. In those surveys, either the equivalence of the measure in the test cases was assured, based on the other questions in the scale, or the test cases were omitted from the analysis sample used to estimate prevalence rates.

in basic food needs, as experienced by U.S. households. Extensive testing was carried out to establish the validity and reliability of the scale and its applicability across various household types in the broad national sample (Hamilton et al., 1997a, 1997b).⁴

Following collection of the September 1996 and April 1997 CPS food security data, Mathematica Policy Research, Inc. (MPR), under a contract awarded by FNS, reproduced independently the results from the 1995 CPS food security data, estimated prevalences of food insecurity and food insecurity with hunger for 1996 and 1997, and assessed the stability and robustness of the measurement model when applied to the separate data sets. The MPR findings (Ohls et al., 2001) establish the stability of the food security measure over the 1995-97 period. That is, the relative severities of the items were found to be nearly invariant across years and across major population groups and household types.

In 1998, USDA's Economic Research Service (ERS) assumed sponsorship of the Census Bureau's annual CPS food security data collection for USDA. In 1999, ERS, FNS, and the National Center for Health Statistics, U.S. Department of Health and Human Services, sponsored the Second Food Security Measurement and Research Conference. The conference included presentations on a range of food security measurement issues and on research applications using the new food security measure (Andrews and Prell, 2001a; 2001b). Discussions at this conference and subsequent interagency meetings led to a decision to combine the two most severe categories and not report "food insecure with severe hunger" as a separate category.

ERS and IQ Solutions (working under a contract awarded by ERS) analyzed the 1998 and 1999 data, applying and refining the procedures developed for USDA in the Abt and MPR research. These analyses found continuing stability of the measure in those 2 years (Cohen et al., 2002a). Research by ERS and FNS also developed measurement methods for assessing the food security of children (Nord and Bickel, 2002) and for measuring the food security of households during the 30 days prior to interview based on the CPS food security survey data available from 1995 to 2004 (Nord, 2002).⁵

In 2003-06 an expert panel convened by the Committee on National Statistics (CNSTAT) of the National Academies conducted a thorough review of the food security measurement methods. USDA requested the review by CNSTAT to ensure that the measurement methods USDA uses to assess households' access—and lack of access—to adequate food and the language used to describe those conditions are conceptually and operationally sound and that they convey useful and relevant information to policy officials and the public. The panel convened by CNSTAT to conduct this study included economists, sociologists, nutritionists, statisticians, and other researchers. One of the central issues the CNSTAT panel addressed was whether the concepts and definitions underlying the measurement methods—especially the concept and definition of hunger and the relationship between hunger and food insecurity—were appropriate for the policy context in which food security statistics are used.

The CNSTAT panel recommended that USDA continue to measure and monitor food insecurity regularly in a household survey, affirmed the

⁴The food security scale reported here is based on the Rasch measurement model, an application of maximum likelihood estimation in the family of Item Response Theory models (Wright, 1977, 1983). These statistical measurement models were developed in educational testing, where test items vary systematically in difficulty and the overall score measures the level of difficulty that the tested individual has mastered. In the present application, the items vary in the severity of food insecurity to which they refer, and the overall score measures the severity of food insecurity recently experienced by household members.

⁵Beginning with the 2005 data, all questions in the food security scale were asked with respect to the last 30 days as well as the last 12 months. These data support calculation of a full-range 30-day scale.

appropriateness of the general methodology currently used to measure food insecurity, and suggested several ways in which the methodology might be refined (contingent on confirmatory research). Research on these issues is currently underway at ERS.

The CNSTAT panel recommended that USDA make a clear and explicit distinction between food insecurity and hunger. Food insecurity—the condition assessed in the food security survey and represented in the statistics in this report—is a household-level economic and social condition of limited or uncertain access to adequate food. Hunger is an individual-level physiological condition that may result from food insecurity. The word “hunger,” the panel stated in its final report, “...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.” To measure hunger in this sense would require collection of more detailed and extensive information on physiological experiences of individual household members than could be accomplished effectively in the context of the CPS-FSS. In the CPS-FSS, one person provides information on all household members, and the basic CPS, which carries the CPS-FSS as a supplement, is focused primarily on employment and other labor force issues. The panel recommended, therefore, that new methods be developed to measure hunger and that a national assessment of hunger be conducted using an appropriate survey of individuals rather than a survey of households.

The CNSTAT panel also recommended that USDA consider alternate labels to convey the severity of food insecurity without using the word “hunger,” since hunger is not adequately assessed in the food security survey. USDA concurred with this recommendation and, accordingly, introduced the new labels “low food security” and “very low food security” to replace “food insecurity without hunger” and “food insecurity with hunger,” respectively, beginning with the 2006 report. USDA is collaborating with partners in the food security measurement community to explore how best to implement other recommendations of the CNSTAT panel.

A large number of independent researchers in the academic and nutrition communities also have used the U.S. food security survey module and food security scale to assess the severity and prevalence of food insecurity in various population groups. One general result of these studies has been to verify the consistency of the measurement construct and the robustness of the measurement method in diverse populations and survey contexts.

Nonetheless, the following caveats need to be kept in mind when interpreting the prevalence estimates in this report:

- The Current Population Survey, which carries the food security survey as a supplement, is representative of the noninstitutionalized population of the United States. It is based on a complete address list of sampled areas (counties and metropolitan areas), but does not include homeless persons who are not in shelters. This may result in an underestimate of the number of persons with very low food security.
- Case study and ethnographic research suggests that some parents are reluctant to report inadequate food intake for their children even when it

has occurred (Hamilton et al., 1997b, p. 88). This may result in an underestimate of the prevalence of very low food security among children based on food security survey data.

- Small, random measurement errors, combined with the nature of the distribution of households across the range of severity of food insecurity, may result in a modest overestimate of food insecurity and very low food security. False positives—the incorrect classification of food secure households as food insecure—are more likely than false negatives because there are more households just above the food insecurity threshold than in a similar range just below it. (Most households are food secure, and the number in each range of severity declines as severity increases.) The same is true at the very low food security threshold (Hamilton et al., 1997a, p. 65; Hamilton et al., 1997b, p. 89).