

United States  
Department  
of Agriculture



Economic  
Research  
Service

Miscellaneous  
Publication  
Number 1598

December 2007

# Informing Food and Nutrition Assistance Policy

## *10 Years of Research at ERS*



Food Assistance & Nutrition  
Research Program

*Economic Research for a Healthy,  
Well-Nourished America*



# Food Assistance & Nutrition Research Program Staff

**David Smallwood**

Program Director

**Victor Oliveira**

Research and Information

**Margaret Andrews**

Food Stamp Program Research

**Elizabeth Frazão**

WIC Research

**Joanne Guthrie**

Child Nutrition Research

**Alex Majchrowicz**

RIDGE Program

**Fax:** (202) 694-5677

**Email:** [FANRP@ers.usda.gov](mailto:FANRP@ers.usda.gov)

**Website:** [www.ers.usda.gov/briefing/foodnutritionassistance](http://www.ers.usda.gov/briefing/foodnutritionassistance)

Cover photos: Eyewire (fruit and vegetables); USDA (little girl); Digital Vision (mom and baby)

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, age, disability, and, where applicable, sex, marital status, familial status, parental status, religion, sexual orientation, genetic information, political beliefs, reprisal, or because all or a part of an individual's income is derived from any public assistance program. (Not all prohibited bases apply to all programs.) Persons with disabilities who require alternative means for communication of program information (Braille, large print, audiotape, etc.) should contact USDA's TARGET Center at (202) 720-2600 (voice and TDD). To file a complaint of discrimination write to USDA, Director, Office of Civil Rights, 1400 Independence Avenue, S.W., Washington, D.C. 20250-9410 or call (800) 795-3272 (voice) or (202) 720-6382 (TDD). USDA is an equal opportunity provider and employer.

# Informing Food and Nutrition Assistance Policy

## *10 Years of Research at ERS*

### Abstract

About one in five Americans participates in at least one of USDA's food and nutrition assistance programs at some point during the year. At a cost of almost \$53 billion in fiscal year 2006—over half of USDA's annual budget—these programs represent a significant Federal investment. Sound research is needed to ensure that the programs operate effectively and efficiently. Since 1998, Congress has provided funds to the Economic Research Service to study and evaluate the Nation's domestic food and nutrition assistance programs. ERS established the Food Assistance and Nutrition Research Program (FANRP) to carry out this activity. FANRP has become the premier source of food and nutrition assistance research in the United States, sponsoring over 600 publications on a wide range of topics related to food and nutrition assistance. This report, prepared at the 10-year anniversary of the FANRP program, highlights some of the key research conducted during the program's first decade.

**Keywords:** food and nutrition assistance research, Food Assistance and Nutrition Research Program, FANRP, Food Stamp Program, child nutrition programs, WIC, income volatility, childhood obesity, food security, welfare reform

**Acknowledgments:** Layout/design: Cynthia A. Ray; Editor: Priscilla Smith

# CONTENTS

<b>Chapter 1 – Introduction</b> .....	4
FANRP – Leading the Way .....	5
FANRP Areas of Research .....	6
Dissemination of Research Findings .....	7
Report Organization .....	7
<b>Chapter 2 – Food Stamp Program Research</b> .....	8
Research Highlights .....	8
Assessing Diet, Health, and Other Program Outcomes .....	8
Program Access and Participation .....	10
Program Administration .....	12
Other Food Stamp-Related Studies .....	13
<b>Chapter 3 – Child Nutrition Programs Research</b> .....	14
Research Highlights .....	15
Assessing Diet and Health Outcomes .....	15
Program Participation .....	16
Program Administration .....	17
<b>Chapter 4 – WIC Program Research</b> .....	20
Research Highlights .....	20
Assessing Diet, Health, and Other Program Outcomes .....	20
Program Access and Participation .....	22
Program Administration .....	23
<b>Chapter 5 – Linkages with the Economy</b> .....	26
Research Highlights .....	26
Economic Conditions Impact the Food Assistance Programs .....	26
Food Assistance Programs Affect Economic Activity .....	27
<b>Chapter 6 – Income Volatility</b> .....	29
Research Highlights .....	29
Income Volatility and Food Stamps .....	29
Income Volatility and Other Food Assistance Programs .....	30
Income Volatility and Food Insufficiency .....	31

<b>Chapter 7 – Welfare Reform</b> .....	32
Research Highlights .....	33
Effect of Welfare Reform on Food Stamp Caseloads .....	33
Effects on Individuals .....	33
Other Studies .....	34
<b>Chapter 8 – Food Security</b> .....	36
Research Highlights .....	36
Measuring Food Insecurity .....	36
Prevalence and Persistence of Food Insecurity .....	37
Outcomes Associated with Food Insecurity .....	38
Predictors of Food Insecurity .....	38
Relationship Between Food and Nutrition Assistance and Food Insecurity .....	39
<b>Chapter 9 – Childhood Obesity</b> .....	41
Research Highlights .....	41
Prevalence and Depth of Childhood Overweight .....	41
The Role of Parents .....	42
Food Consumption and Food Prices .....	44
Consequences of Overweight .....	44
Relationship of Food and Nutrition Assistance Programs to Obesity .....	44
<b>Chapter 10 – Dietary Reference Standards and Nutrition Monitoring</b> .....	46
Research Highlights .....	46
<b>Chapter 11 – Data Development</b> .....	49
Data Development Highlights .....	49
Enhanced Data Collection .....	49
Development of Data Collection Instruments and Methodologies .....	50
Encouraging the Use of Publicly Available National Surveys ....	51
<b>Chapter 12 – Addressing the Future</b> .....	52
<b>References</b> .....	54
<b>Appendix – Broadening Participation in Research</b> .....	59

**Recommended citation format for this publication:**


U.S. Department of Agriculture, Economic Research Service. *Informing Food and Nutrition Assistance Policy: 10 Years of Research at ERS*. MP-1598. December 2007.

## CHAPTER 1

# INTRODUCTION

One of USDA's primary goals is to improve the Nation's nutrition and health. Sound nutrition is essential for physical growth, cognitive development, health, and well-being. To provide a nutritional safety net for children and low-income adults, USDA administers 15 domestic food and nutrition assistance programs that work both individually and collectively to provide participants with food, the means to purchase food, and nutrition education. The focus on nutrition differentiates these programs from other Federal means-tested programs.

Food and nutrition assistance programs vary by size, by type of benefit provided, and by target population. They affect the lives of millions of people. In fiscal year 2006, participation in the Food Stamp Program averaged nearly 27 million people per month, or about 1 in 11 Americans (Oliveira, 2007). During the same year, some 30 million children—over half of all schoolchildren—participated in the National School Lunch Program on a typical schoolday. Meanwhile, the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC) served almost half of all infants born in the United States and about one-quarter of all children ages 1-4. In total, about one in five Americans participate in at least one of USDA's food and nutrition assistance programs at some point during the year. At a cost of almost \$53 billion in fiscal year 2006—over half of USDA's annual budget—these programs repre-



Photos: Comstock/© 2007 Jupiterimages Corporation (background, upper and lower left); Adam Borkowski/Shutterstock (upper right); Ken Hammond, USDA (lower right)

sent a significant Federal investment (fig. 1-1).

Because of the importance of the food and nutrition assistance programs to both program participants and taxpayers, sound research is needed to ensure that the programs operate effectively and efficiently. Since 1998, Congress has provided funds to the Economic Research Service (ERS)—the primary source of economic information and research in USDA—to study and evaluate the Nation’s domestic food and nutrition assistance programs. ERS established the Food Assistance and Nutrition Research Program (FANRP) to carry out this activity. Using a strong economic framework to guide the research, FANRP has become the premier source of food and nutrition assistance research in the United States, sponsoring over 600 publications on a wide range of topics related to food and nutrition assistance. This report, prepared at the 10-year anniversary of the FANRP program, highlights some of the key research conducted during the program’s first decade.

### FANRP—Leading the Way

FANRP’s mission is to conduct “economic research for a healthy, well-

**FANRP Principles**

FANRP principles that ensure the reliability, integrity, and usefulness of the program’s research include:

- research that meets the needs of all stakeholders—program participants, USDA, Congress, and the public
- integrated, comprehensive program that conducts research in the broader context of the current and future economic and social environments
- broad array of public and private entities directly involved in the research, evaluation, and review efforts
- integration of ERS staff expertise in the development, implementation, and accomplishment of research projects
- scientifically rigorous studies and evaluations with verifiable and unbiased results
- rigorous internal and external review of research results
- public availability of data
- wide distribution of research findings
- development and maintenance of continuous data sets

nourished America.” The research is designed to meet the critical information needs of USDA, Congress, policy officials, program participants, the research community, and the public at large. To address the needs of this diverse group, FANRP conducts a multifaceted research plan consisting of both intramural and extramural

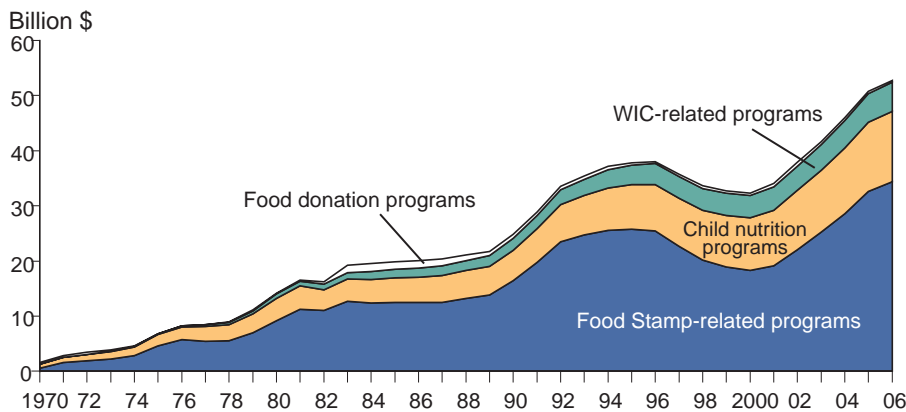
research. The intramural program, conducted by ERS research staff, uses the agency’s large research capacity, taking advantage of researchers’ experience and specialized knowledge. At the same time, FANRP funds extramural research, often conducted jointly with ERS staff, that draws on the multidisciplinary expertise of nationally recognized social and nutrition science researchers and the resources of noted institutions such as the National Academy of Sciences, National Science Foundation, National Bureau of Economic Research, Urban Institute, the Brookings Institute, and numerous universities across the country. Through the use of contracts, grants, and extramural agreements, FANRP has funded over 220 extramural projects.

To stimulate new and innovative research on food assistance and nutrition issues and to broaden the participation of social science scholars

Figure 1-1

### USDA expenditures for food assistance, FY 1970-2006

Expenditures totaled almost \$53 billion in fiscal 2006



Source: Oliveira, 2007.



Ken Hammond, USDA

in these issues, FANRP sponsors the Research Innovation and Development Grants in Economics (RIDGE) program. The program supports both quantitative and qualitative research methods to explore economic, nutrition, and health outcomes of participation in USDA's food and nutrition assistance programs as well as issues surrounding program implementation and delivery. Funded by FANRP, the

RIDGE program is administered through selected universities and their associated research institutes located at five sites across the United States. Each of the five institutions takes a different aspect of food assistance, nutrition, or subgroup of recipients as its primary focus.

### FANRP Areas of Research

The three core areas of FANRP research are:

- Program Outcomes and Economic Well-Being of Participants**— USDA's food and nutrition assistance programs share the main goal of ensuring the health of vulnerable Americans by providing access to a nutritionally adequate diet. Economic factors influence participants' behavior and the degree to which program goals are achieved. The programs also influence the economic well-being of participants through changes in food expenditures; depth and severity of poverty, food security,

and income volatility are also important.

- Program Access and Economic Determinants of Participation**— USDA seeks to ensure access for all those who are eligible to participate in its food and nutrition assistance programs. The extent to which eligible individuals participate in programs and the factors that influence those decisions are key to measuring how well the program is reaching its target population. FANRP provides economic information on the population being served and on the eligible but unserved population to determine if the program is serving those who are most vulnerable and in need of program resources. Analysis of the economic factors affecting program participation allows policymakers and program analysts to better anticipate and forecast future fluctuations in program participation and can influence budgetary decisions for the program.





- **Program Dynamics and Efficiency** – With increased Federal Government focus on accountability and efficiency, reliable, unbiased information on how the Nation’s food and nutrition assistance programs are administered is increasingly important. An essential objective of FANRP is to provide research to policymakers that improves program operations. As such, FANRP has conducted a number of studies mandated by Congress including the assessment of cost-containment practices and the economic impact of food assistance programs on nonparticipants. Because food and nutrition assistance programs interact with various industry sectors and markets, FANRP also conducts research on how the programs impact food prices, farm income, and rural areas.

Within these three broad long-term topics, priority areas of research are reviewed and selected annually. In developing the annual research priorities, FANRP works closely with USDA’s Food and Nutrition Service (FNS), the agency responsible for administering the Department’s food assistance and nutrition programs. FANRP also seeks input from a broad constituency of policy officials, researchers, practitioners, advocates, industry groups, and service providers. In conjunction with these activities, FANRP sponsors an annual roundtable discussion, open to the public, to identify crucial research and information needs supporting food and nutrition assistance programs and to ensure the policy and program relevance of the annual research agenda.

## FANRP conducts comprehensive review of the impacts of USDA’s food and nutrition assistance programs

Prior to FANRP’s establishment, an extensive amount of research had assessed the impact of specific food and nutrition assistance programs on nutrition and health, but there had been no overall assessment of the effects of the programs on the diet and health outcomes of participants. In response, one of the first studies commissioned by FANRP was a comprehensive review and synthesis of published research from over 300 publications on the impact of USDA’s domestic food and nutrition assistance programs on participants’ diet and health. The resulting report – the most systematic and thorough assessment to date of published research on the topic – summarizes what is and what is not known about the nutrition- and health-related impacts of USDA’s food and nutrition assistance programs (Fox et al., 2004). The outcome measures reviewed included food expenditures, nutrient availability, dietary intake, birth outcomes, and other measures of nutrition status. Companion reports resulting from the same study include a review of the research designs available to evaluators for assessing the effect of USDA’s food assistance and nutrition programs (Hamilton and Rossi, 2002) and an evaluation of various data sources for their potential for analyzing the impacts of the programs (Logan et al., 2002).


### Dissemination of Research Findings

One of FANRP’s guiding principles is to make all of its research publicly available. FANRP uses a variety of approaches to disseminate research findings to diverse audiences. The award-winning ERS website, [www.ers.usda.gov/](http://www.ers.usda.gov/), is the primary gateway for FANRP products published by USDA. FANRP also publishes research in the ERS periodical *Amber Waves*, and in a variety of peer-reviewed professional journals. FANRP research is also widely presented at policy and program conferences. ERS offers free email notification that provides subscribers with weekly updates on new publications, upcoming conferences, and funding opportunities related to food and nutrition assistance ([www.ers.usda.gov/Updates/](http://www.ers.usda.gov/Updates/)).

### Report Organization

The next three chapters discuss FANRP research that focuses on the main food and nutrition assistance programs: the Food Stamp Program (chapter 2), the child nutrition programs (chapter 3), and WIC (chapter 4). Topics that cut across food and nutrition assistance programs include linkages with the economy (chapter 5), income volatility (chapter 6), and welfare reform (chapter 7). Other topics related to food assistance include food security (chapter 8), childhood obesity (chapter 9), and dietary reference standards and nutrition monitoring (chapter 10). FANRP’s data development activities are discussed in chapter 11, while the summary and future challenges for FANRP comprise chapter 12.

# FOOD STAMP PROGRAM RESEARCH

A woman with dark hair tied back, wearing a light blue button-down shirt, is standing in a grocery store aisle. She is holding a can of food in her hands and looking at it. A red shopping basket is visible in front of her. The background shows shelves stocked with various food items.

The Food Stamp Program is the cornerstone of USDA's food and nutrition assistance programs, accounting for 62 percent of all food and nutrition assistance spending in fiscal year 2006 (Oliveira, 2007). Unlike other food and nutrition assistance programs that are targeted toward special population groups, the Food Stamp Program is available to most needy households (subject to certain work and immigration status requirements). Eligibility and benefits are based on household size, household assets, and gross and net income (gross monthly income cannot exceed 130 percent of the Federal poverty guidelines). By providing monthly benefits that are redeemable at authorized retail food stores, the program enables participants, over half of whom are children, to improve their diets by increasing their food-purchasing power.

### Research Highlights

#### *Assessing Diet, Health, and Other Program Outcomes*

Participation in the Food Stamp Program is expected to lead to better nutritional outcomes via the following pathway: food stamp benefits increase the purchasing power of participants, resulting in increased spending on food, which in turn leads to increases in the nutrients available to the household, and ultimately results in increased nutrient intake of household members. FANRP studies

have examined various diet and health-related outcomes as well as other outcomes potentially associated with participation in the program, such as reduction in child poverty and improvement in student learning.

### ***Food Stamp Program increases household food expenditures***

The comprehensive review of published research on food assistance programs' impacts by Fox et al. (2004) concluded that existing research has consistently shown that the Food Stamp Program, as intended, increases household food expenditures.

However, the review found little evidence that the program has a positive influence on food intake patterns. That is, increased food spending does not necessarily lead to improved nutrition (for example, participants could buy more expensive food that is no higher in nutrients).

### ***Food stamps increase intake of some food groups, but not others***

A study of how participation in the Food Stamp Program affected dietary quality, as measured by intake of the five major "pyramid" food groups (meats, fruits, vegetables, grains, dairy) plus added sugars and total fats, found that food stamp participation tends to increase one's intake of meats, added sugars, and total fats, but does not significantly change one's intake of fruits, vegetables, grains, or dairy products (Wilde et al., 2000b). The effects of food stamp use were found to be similar to the effects of having substantially more income. The study concluded that while food stamps appear to help low-income Americans acquire more of the food energy and other nutrients they need, food stamps may not improve program participants' overall diet quality.

## **Research Summary**

FANRP research has improved our knowledge of numerous issues related to the Food Stamp Program. FANRP's comprehensive review of food assistance literature found while previous research has clearly shown that participation in the Food Stamp Program increases household's food expenditures, the program's effect on intake and dietary quality is less certain. FANRP research has shown that a number of factors influence whether eligible households participate in the program, including knowledge of program eligibility, employment characteristics, and local food stamp office policies and practices. At the national level, economic conditions and program policies affect food stamp caseloads. State policy options in the Food Stamp Program have expanded over the last decade and FANRP has examined some of these options, such as simplified reporting and transitional benefits, as well as benefit issuance errors and the use of EBT. FANRP research has also increased understanding of how the dual constraints of time and income affect meal preparation.

### ***Latest evidence suggests food stamps do not lead to obesity in adults***

The growing prevalence of obesity over the last few decades has raised concern in the health community. As discussed above, evidence suggests that the Food Stamp Program increases expenditures for food. Some have questioned whether this increase in food expenditures leads to overconsumption of calories and obesity. A positive relation between food stamps and overweight and obesity in women appeared to exist in the late 1980s and 1990s. During the same period, men who received food stamps tended to be lighter than either eligible nonparticipants or higher income men. However, estimates based on 1999-2002 data show a weakening relationship between food stamp receipt and weight status (Ver Ploeg, 2006). Among women, food stamp participants are not getting relatively heavier over time. Rather, Body Mass Index (BMI) has grown more among eligible nonparticipants—and even among women with higher incomes—than among food stamp recipients. For men, it appears that food stamp participants are catching up weight-wise with nonparticipants. Although the latest evidence suggests there is no longer a difference in obesity rates

between food stamp participants and others, more research is needed to understand what factors drive obesity and what roles food assistance programs should play.

### ***Strategies to improve diets of food stamp recipients are explored***

To help food stamp participants make more nutritious food choices, USDA has expanded its investment in nutrition education. State governments and health advocates are also looking at modifications to the Food Stamp Program that could reinforce nutrition education, including: restricting the foods allowable for purchase with food stamp benefits (e.g., restricting food stamp participants' purchases of foods and beverages high in calories, fats, and/or sugars) and expanding benefits to allow participants to buy more of healthful but underconsumed foods, such as fruits and vegetables, via bonuses or vouchers. The success of either restrictions or targeted benefits depends on a number of economic factors. A recent article discusses FANRP research on these economic factors and provides insight into the likely effectiveness of possible program modifications in improving the diets of program participants (Guthrie et al., 2007).

**Food stamps reduce the depth and severity of child poverty**

Jolliffe et al. (2003) looked at the effect of food stamps on children’s overall well-being by adding the value of food stamp benefits to household income and then measuring the effect on child poverty rates. The “food stamp effect” reduced the number of children in poverty in 2000 by only 4 percent. This relatively small effect is largely because the amount of food stamp benefits declines as a household’s income increases, and while many poor people become less poor due to the value of food stamp benefits, few receive enough food stamps to lift them above the poverty line. However, augmenting income with the value of food stamp benefits reduced the depth of child poverty (the amount of income needed to raise income to the poverty threshold) by 20 percent or more. The study shows the insufficiency of examining the effect of food stamps on only the incidence of poverty, which leads to the incorrect conclusion that

food stamps do not have much impact on reducing child poverty.

**Program participation is associated with better academic learning for girls**

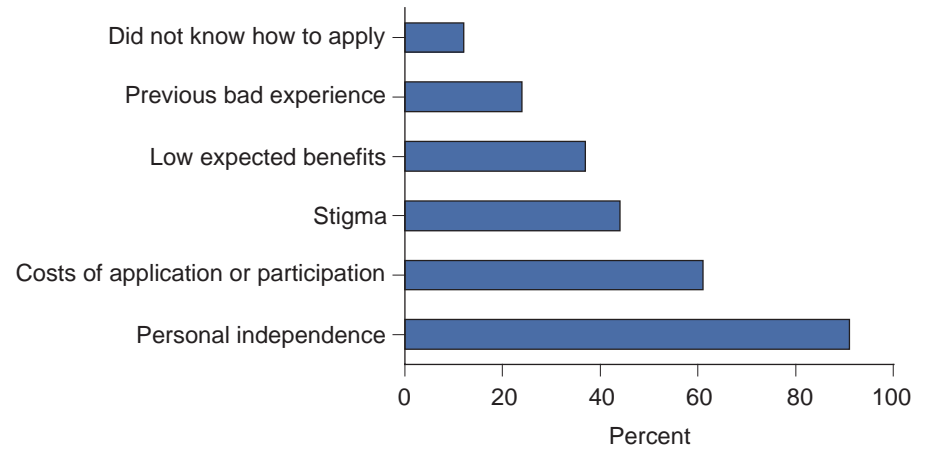
Frongillo et al. (2006) found that, for girls, starting Food Stamp Program participation during the 4 years from kindergarten to third grade was associated with about a 6-point improvement in reading



Figure 2-1

**Reasons eligible households would not participate in the Food Stamp Program**

*Most common reason was a desire for personal independence*



Source: Bartlett et al., 2004.

scores and a 3-point improvement in mathematics scores compared with stopping Food Stamp Program participation during that period. There was no significant improvement in reading and mathematics scores for boys who were food stamp program participants. The findings suggest that Food Stamp Program participation can have beneficial effects for some children on nonnutritional outcomes, specifically academic learning.

**Program Access and Participation**

The Food Stamp Program is the primary source of food assistance to low-income people. Thus, program managers and policymakers have long been concerned about how best to ensure that eligible households have access to the program. A number of FANRP studies have examined factors influencing households’ program participation decisions and factors explaining food stamp caseload fluctuations.

**Many nonparticipants do not know they are eligible to participate**

Because the Food Stamp Program cannot assist low-income households if they do not enroll, it is important to understand the reasons why some eligible households do not participate. Over half of approximately 6 million apparently eligible households who were not participating in the program in June 2000 either believed they were ineligible or were not sure if they were eligible (Bartlett et al., 2004). Nonparticipating households in relatively more favorable economic circumstances – that is, those closer to the eligibility cutoff – tended to be less certain of their eligibility for food stamps. Those who believed themselves ineligible, or who were unsure of their eligibility, were more likely to have above-poverty incomes and to have bank accounts.

**Some nonparticipants would not participate even if they knew they were eligible**

While most nonparticipant households (69 percent) reportedly would apply for food stamps if they were certain they were eligible, 31 percent

would not apply (Bartlett et al., 2004). These households cited both personal reasons and reasons related to food stamp office policies and practices for their lack of desire to apply (fig. 2-1). The most common set of reasons was related to a desire for personal independence (91 percent). Additionally, nearly three-quarters reported at least one reason related to food stamp office policies, including perceived costs of applying (64 percent), a previous “bad experience” with the Food Stamp Program or another government program (24 percent), costs of participation (17 percent), and confusion about how to apply (12 percent).

#### **Local office policies and practices affect eligible households’ participation decisions**

Bartlett et al. (2004) also found that local food stamp office policies and practices such as positive supervisor attitudes and child-friendly offices enhanced program access. Restricted office hours and the fingerprinting of applicants, for example, inhibited program access. These results indicate that food stamp administrators can affect participation levels by the way local offices are run and by how clients are treated.

#### **Employment characteristics also influence Food Stamp Program participation**

Low-income working households are less likely to participate in the program if household members work traditional daytime hours, hold multiple jobs, and work long hours (McKernan and Ratcliffe, 2003). These results suggest that the participation may depend on ease of access to the program. For example, eligible individuals who work traditional daytime hours may find it difficult to get to the food stamp office to apply for and recertify for

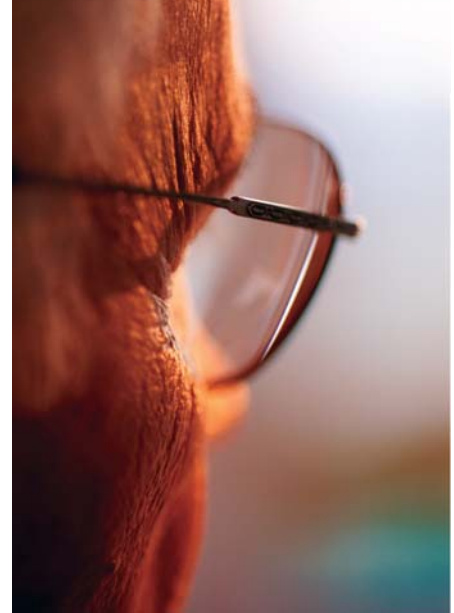
food stamp benefits during typical daytime hours of operation.

#### **New approaches can increase program participation by the elderly**

Historically, low-income seniors age 60 and older who qualify for food stamp benefits participate at relatively low rates. This is especially troublesome because the elderly have unique nutrition needs and many suffer from medical conditions that require special diets. Although Wilde and Dagata (2002) found some evidence that elderly with greater needs are likely to participate in the Food Stamp Program, they also found evidence of unmet need among elderly nonparticipants. To identify effective strategies for increasing participation among the elderly population, USDA tested three pilot demonstration models in six States that take different approaches to reducing costs of applying for food stamps:

- 1) the simplified eligibility model reduced the information applicants must provide to verify eligibility,
- 2) the application assistance model provided one-on-one help in completing the application process,
- 3) the commodity alternative benefit model provided packages of commodities instead of traditional food stamp benefits.

An evaluation of the pilot programs showed that demonstration models can increase the number of participating seniors by 20-35 percent; however, the costs can be significant (Cody and Ohls, 2005). The simplified eligibility model, designed to reduce the time and effort it takes seniors to apply for food stamps, was the most cost-effective approach to increasing participation—monthly demonstration



Comstock/© 2007 Jupiterimages Corporation

costs amounted to \$402 net per new household attracted to the program.

#### **A strong economy and changes in social welfare programs contributed to the decline in participation in the late 1990s**

Food stamp caseloads have fluctuated greatly in recent decades, falling from a high of 27.5 million in fiscal year 1994 to 17.2 million in fiscal year 2000 (a 37-percent decrease), before rebounding to 26.7 million in fiscal year 2006 (a 55-percent increase). Understanding the factors behind these dramatic swings is important both for judging the success of existing policies and for developing effective policies. Wilde et al. (2000a) used an econometric model to calculate that 35 percent of the caseload decline from 1994 to 1998 was associated with changing economic conditions and 12 percent with program reform and political variables. As is typical with such models, a large share (in this case, more than half) of the change in participation cannot be explained by either group of variables. The study also concluded that 28 percent of the total change in participation was associated with a decrease in the number of people with low income (below 130 percent of the poverty line) and 55 percent was due to a decline in the proportion of low-income people who participate. This

decline in the proportion of low-income people who participate may be due to economic conditions or program changes or both.

**Changes in program entry and exit patterns also contribute to caseload change**

A rise in the entry rate was the driving force behind caseload growth in the early 1990s, although another factor was that individuals tended to stay longer in the Food Stamp Program during this period than at other points of the 1990s (Cody et al., 2005). The caseload decline of the late 1990s was driven predominantly by shorter participation length, although lower entry rates also contributed. Among all new entrants in the program in the 1990s, more than half exited the program within 8 months and two-thirds exited within 1 year. The elderly had the longest length of participation spells (half had spells of 15 months or more) while able-bodied adults without dependents had the shortest length of participation spells (half exited by the end of their fourth month) (fig. 2-2).

**Program Administration**

Accounting for well over half of all Federal food assistance spending, it is especially important that the Food Stamp Program operate as efficiently as possible. FANRP has sponsored numerous studies evaluating strategies to improve efficiency and integrity in the Food Stamp Program.

**Customer service waivers did not affect food stamp recipient satisfaction with EBT**

Since 2004, all food stamp benefits have been issued via electronic benefits transfer (EBT) systems. With an EBT card, food stamp customers pay for groceries without any paper coupons changing hands. To promote operational efficiency, some States have received waivers of certain rules governing EBT use. Kirlin and Logan (2002) found that two waivers – one allowing recipients to select their own personal identification numbers and one allowing them to receive EBT training by mail rather than in person – caused difficulties for new food stamp recipients, and the difficulties were more apparent among the elderly or disabled. However, the problems tended to disappear as new

users gained EBT experience. The study concluded that the customer service waivers did not affect recipient satisfaction with the EBT system. The high level of satisfaction recipients expressed suggests that most problems with the waivers were either transitory or minor.

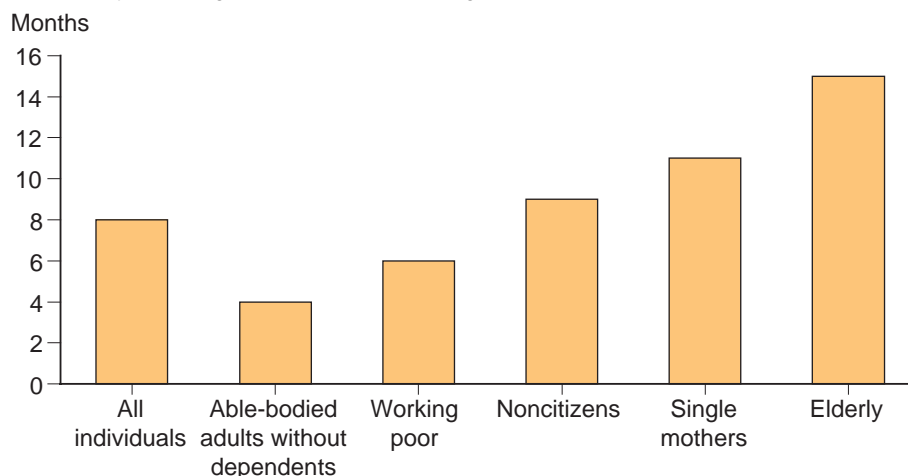
**FANRP examined several Food Stamp Program options**

In November 2000, the Federal Government established two options in the Food Stamp Program intended to streamline the change reporting process and to continue food stamp benefits for recipients leaving the Temporary Assistance for Needy Families (TANF) program. Congress subsequently expanded these two options as part of the 2002 Farm Bill. Trippe et al. (2004) examined the experiences of four States (Arizona, Louisiana, Missouri, and Ohio) in implementing the two options – simplified reporting and Transitional Benefit Alternative. With simplified reporting, States lengthen the certification period for most food stamp recipients, minimize reporting requirements between recertifications, and reduce exposure to quality control errors. This option was intended both to improve client access to food stamps and to reduce staff workload without increasing quality control error rates. With transitional benefits, States automatically continue benefits for up to 5 months for most families who leave the Temporary Assistance for Needy Families (TANF) program without requiring the families to take any action to retain these benefits. This option was intended to ensure that eligible families leaving TANF continue to receive food stamp benefits. The study found that the simplified reporting option reduced staff workload, improved client access, and reduced quality control errors. However, the simplified reporting option faced some operational challenges that limited the option’s full

Figure 2-2

**Median Food Stamp Program spell length by subgroup in the 1990s**

*The elderly and single mothers had the longest participation spells*



Source: Cody et al., 2005.

potential. Transitional benefits were considered a valuable support for families but required substantial planning and staff resources.

### ***Frequent recertifications for cases with earnings reduce the rate of participation***

Mills et al. (2004) explored the effects of more frequent recertification of food stamp cases on payment accuracy and household participation in the Food Stamp Program. During the 1997-2001 study period, USDA allowed States increasing flexibility to adopt reporting systems that eased the requirements for clients of reporting income changes or other circumstantial changes within a certification period. Some of the new options (such as quarterly or semi-annual reporting) called for less frequent client reporting of changes affecting eligibility or benefit. A motivating concern of the study was that the use of short certification periods (3 months or less) as a strategy to reduce case error might unintentionally reduce program participation. The findings suggest that more frequent recertifications for cases with earnings may have effects that are more pronounced in reducing the rate of participation than in reducing the rate of error. As intended, shorter certification periods led to higher closure rates for error cases than would otherwise occur through interim action. However, more frequent recertification also led to higher closure rates for correct cases, mitigating the intended reduction in the case error rate.

### ***Increased certification activity, while costly, contributes to reduced error rates***

The administration of the Food Stamp Program is a major expense to USDA and the States. There is a careful balancing act between the cost of benefit issuance errors and the administrative costs of preventing and



detecting benefit issuance errors. Logan et al. (2006) examined trends and composition of Food Stamp Program administrative costs from 1989 to 2001 and analyzed the relationship of reported certification costs to Food Stamp Program error rates. Their findings provide strong evidence that increases in certification-related costs contributed to reduced error rates after 1995. The results also imply that, in the period after welfare reform, States had to spend more effort on certification-related activities than in previous years to achieve a given level of accuracy.

### ***Other Food Stamp-Related Studies***

#### ***Operating costs for stores with high food stamp redemption rates are similar to costs in other stores***


Whether the poor pay more for food than other income groups matters to their nutrition and health. Therefore, the operating costs of the stores at which they shop are important. A study by King et al. (2004) found that stores with more revenues from food stamps had significantly different cost structures than stores that receive less of their revenues from food stamp redemptions, but the overall operating

costs were essentially the same. Study results suggest that if the poor do pay more for food, factors other than operating costs are likely to be the reason.

### ***Time allocated to cooking varies with both monetary and time resources***

In one of the first studies to examine how time resources influence time spent in preparing food, Mancino and Newman (2007) found that individual and household characteristics, such as income, employment status, gender, and family composition, affect food preparation decisions. Full-time work and single-parent status appear to have a larger impact on time allocated to food preparation than do an individual's earnings or household income. The results are relevant for the design of food assistance programs because households participating in the Food Stamp Program are increasingly headed by a single parent or two working parents. As this trend continues, more low-income households may find it difficult to allocate the time needed to prepare meals that fit within a limited budget and meet dietary requirements.

# CHILD NUTRITION PROGRAMS RESEARCH



USDA's child nutrition programs give students a better chance for success. Well-nourished children are healthier, more able to learn in school, and more likely to grow into productive members of society. For the low-income children to whom the programs provide meals and snacks free or at reduced prices, the programs may be especially important in breaking the cycle of poverty.

Many of this Nation's children are served by one or more of USDA's child nutrition programs. The National School Lunch and School Breakfast Programs provide nutritious meals to children in participating schools: students from low-income families receive free or reduced-price meals. Higher income students purchase the meals at "full price," although their meals are still subsidized to a small extent by USDA. USDA also promotes nutrition education in schools through its Team Nutrition Initiative. The Child and Adult Care Food Program subsidizes healthy meals and snacks in participating child care centers, family daycare homes, and adult daycare facilities. The providers of care are reimbursed for each type of qualifying meal (breakfast, lunch/supper, or snack) they serve. The Summer Food Service Program funds meals for children in low-income areas when school is not in session.



## Research Summary

FANRP research has provided insight on numerous issues related to the child nutrition programs. FANRP's comprehensive review of relevant evaluation studies found that there was little or no up-to-date information about the effects of USDA child nutrition programs because most of the previous studies of the school meal programs' impact on participants' nutrition and health were conducted before the 1995 start of the School Meals Initiative for Healthy Children that was designed to improve the nutritional quality of school meals. The other child nutrition programs, including the Child Care Food Program and the Summer Food Service Program, have not been well studied, primarily because of the difficulty and cost of collecting representative data on program participants (see the chapter on "Data Development" for information on FANRP's efforts to develop data and methodologies that will enhance the ability to study issues related to child nutrition programs in the future).

Recent FANRP studies have shown that younger children are more likely than older children to participate in school meal programs, and that, while almost all children from food stamp or TANF households receive free school meals, the reverse is not the case. FANRP has conducted a number of congressionally mandated studies regarding program operations, on issues related to plate waste in schools, the Fruit and Vegetable Pilot Program, tiering in the Child and Adult Care Food Program, and direct certification in the National School Lunch Program.

evidence that participation in the National School Lunch Program increases total household food expenditures, existing evidence of the program's impacts on nutrition and health outcomes is limited. Research suggests that low-income students are more likely to consume a substantial breakfast when the School Breakfast Program is available to them. However, the program's impact on students' dietary intakes, after the School Meals Initiative was implemented is unknown. Similarly, the effects of USDA-funded nutrition education on food choices both at school and elsewhere have not been evaluated in a nationally representative sample.

### *Studies of other child nutrition programs' impact on nutrition and health outcomes are lacking*

The review by Fox et al. (2004) found that few studies had examined the effect of the Child and Adult Care Food Program on nutrition and health outcomes, and those that had are dated and/or severely limited. The impact of the Summer Food Service Program on the nutrition and health status of participants has not been studied. Evaluations of these programs have been limited by the difficulties and cost of collecting representative data on program participants.

## Research Highlights

### **Assessing Diet and Health Outcomes**

Child nutrition programs can have an important impact on children's diets. On an average schoolday, over half of all U.S. schoolchildren participate in the National School Lunch Program, and over 17 percent participate in the School Breakfast Program. Participating schools must serve lunches that meet Federal nutritional requirements and offer free or reduced-price lunches to needy children. During the summer when school is out, some children receive meals from the Summer Food Service Program. Children participating in the Child and Adult Care Food Program may eat multiple meals and/or snacks each day at the child care center or family daycare home where they participate. Many of these participants are preschoolers, an age crucial for growth and development and for the formation of healthy eating habits.

### ***The impact of school meals on nutrition and health outcomes remains unresolved***

The school meals programs have received the most evaluations of any of the child nutrition programs, yet their impact on nutrition and health is uncertain. In FANRP's comprehensive literature review of the effects of food assistance programs on nutrition and health, Fox et al. (2004) concluded that the National School Lunch and the School Breakfast Programs operations changed substantially after most of the available research was completed. For example, most of the studies predate the School Meals Initiative for Healthy Children, launched in 1995, which was designed to improve the nutritional quality of school meals (key components of the initiative included revised nutrition standards for school meals, a major restructuring of menu planning, and a broad-based nutrition education program). One cannot assume that findings from earlier research apply to today's school meals programs. While there is



Ken Hammond, USDA

**The availability of a School Breakfast Program may have beneficial effects for children**

Bhattacharya et al. (2004) examined the efficacy of school nutrition programs in improving a broad range of dietary outcomes by comparing the nutritional status of students and their families during the school year with students' nutritional status when school is out. Study results suggested that the School Breakfast Program is beneficial for children. The study found evidence that children who have a School Breakfast Program available consume a better overall diet, consume a lower percentage of calories from fat, are less likely to have a low intake of magnesium, and are less likely to have low serum levels of vitamin C and folate. For every outcome examined, School Breakfast Program availability either promoted better outcomes or at the least did not promote worse outcomes. While the study indicated that the National School Lunch program had little detectable effect on children's diet, these results were not as reliable as the school breakfast results due to methodological issues related to the National School Lunch Program's widespread availability.

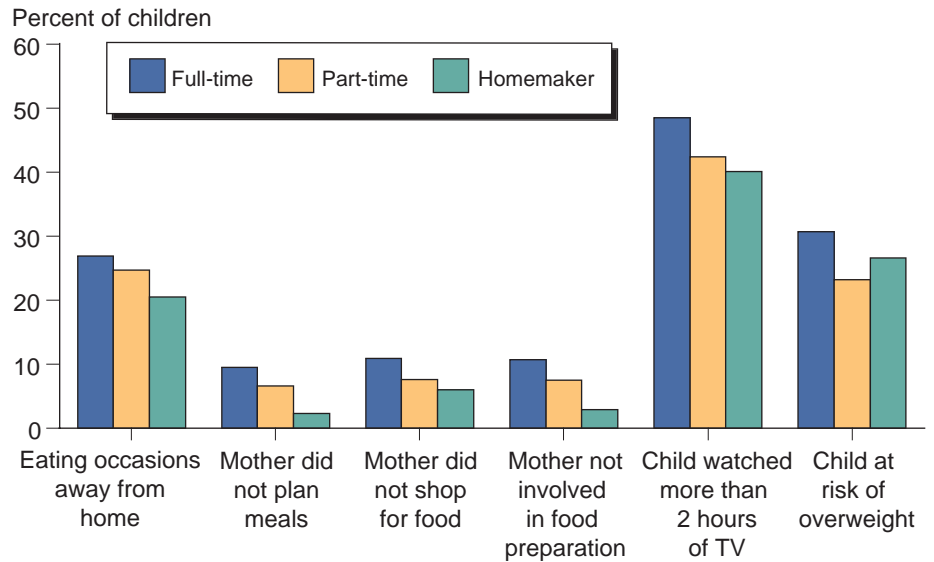
**Maternal employment affects children's nutrition**

As a result of the dramatic increase in labor force participation among women in recent decades, a majority of women with children are now employed outside the home. Economic theory suggests that families in which mothers work outside the home must make tradeoffs between the advantages of greater income and the disadvantages of less time for home food production and involvement in children's activities. Crepinsek and Burstein (2004b) examined differences in nutrition and nutrition-related outcomes among children whose

Figure 3-1

**Nutrition-related outcomes by maternal employment status**

*Children of mothers who work full-time have worse outcomes*



Source: Crepinsek and Burstein, 2004b.

mothers worked full-time, part-time, and not at all. The study found that working mothers participate less in meal planning, shopping, and food preparation and the children of full-time working mothers were more likely to skip morning meals, rely more on away-from-home food sources, spend more time watching TV and videos, and face significantly greater risk of overweight (fig. 3-1). However, for those children participating in Child and Adult Care Food Program, participation made substantial positive contributions to intakes of key nutrients, indicating the important role the program may play in promoting the well-being of children of employed mothers (Crepinsek and Burstein, 2004a).

**Program Participation**

FANRP research on the demographic characteristics of school meal participants may help program administrators more effectively target the program.

**School meal participation is lower among older students**

A study by Newman and Ralston (2006) that examined the economic and demographic characteristics of students served by the National School Lunch Program found that overall participation in the program (including free, as well as reduced- and full-price meals) was lower among high school students than among children ages 8-13. This finding is partly related to younger students' being more likely to have lower household incomes and thus more likely to qualify for free and reduced-price meals. Thirty-four percent of students ages 8-13 came from families below 130 percent of the poverty line while only 30 percent of students ages 15-18 did. Previous studies have also identified greater feelings of stigma regarding school meals among older students.

**Most households with students receiving a free lunch were not participating in either the Food Stamp Program or TANF**

Newman and Ralston (2006) also found that almost all students in households participating in the Food Stamp Program or TANF program received free lunches. However, two-thirds of students receiving free lunches through the National School Lunch Program were in households that did not participate in the Food Stamp Program or in TANF, even though their income levels were sufficiently low to qualify for benefits. The National School Lunch Program does not have some of the restrictions that may discourage participation in the Food Stamp Program and TANF, such as asset limits and proof of income, and schools also encourage families to apply for program certification by sending home application forms with students. The results suggest that there is room for expanding access to the Food Stamp Program and TANF among the many free-lunch beneficiaries who are possibly eligible for the other programs as well.

**Program Administration**

FANRP has conducted a number of studies examining issues related to the operation of child nutrition programs, including several that were conducted in response to congressional mandates.

**Plate waste in schools reflects lost opportunities to improve children's diets**

A report to Congress reviewed studies on the extent of plate waste in the school nutrition programs and the factors associated with it (Buzby and Guthrie, 2002). Some plate waste—the quantity of edible portions of food served through USDA's school nutrition programs that students discard

each year—is ubiquitous and unavoidable. Nevertheless, to the extent that meals—or particular items in those meals, such as fruits and vegetables—are not consumed by children, the full nutritional benefits of the program may not be achieved. Based on a review of the literature, the best national estimate available indicated that about 12 percent of calories from foods served as part of the National School Lunch Program are wasted, resulting in a direct economic loss of over \$600 million. Vegetables and fruits appear to be the most likely items to be uneaten. Possible causes of plate waste include wide variation in student appetites and energy needs, differences between meals served and student preferences, scheduling constraints that interfere with meal consumption or result in meals being served when children are less hungry, and availability of substitute foods from competing sources.

**Fruit and Vegetable Pilot Program in schools found to be popular**

To promote fresh fruit and vegetable consumption among the Nation's schoolchildren, the Nutrition Title of the 2002 Farm Act provided \$6 million for USDA to award to schools

through a Fruit and Vegetable Pilot Program for the 2002-03 school year. The pilot program provided fresh and dried fruits and fresh vegetables free to children in 107 elementary and secondary schools in Indiana, Iowa, Michigan, Ohio, and New Mexico. Pilot funds were allocated to each school on a per student basis, which amounted to \$94 per student. The pilot's intent was to determine the feasibility of such a program and its success as determined by the students' interest in participating. A congressionally mandated evaluation of the pilot found that almost all schools participating in the pilot considered the program to be very successful and would like the pilot to continue (Buzby et al., 2003). Of the 105 schools reporting on feasibility, 100 believed that it is feasible to continue the pilot if funding were made available. Schools reported that 80 percent of students were very interested in the pilot, and another 18 percent were somewhat interested; 71 percent of the schools reported that students' interest had increased during the pilot period. The positive results of this evaluation led to Congress' decision to extend the pilot program during the subsequent school year and to make the program permanent in 2004.



### **Direct certification increases participation in the National School Lunch Program**

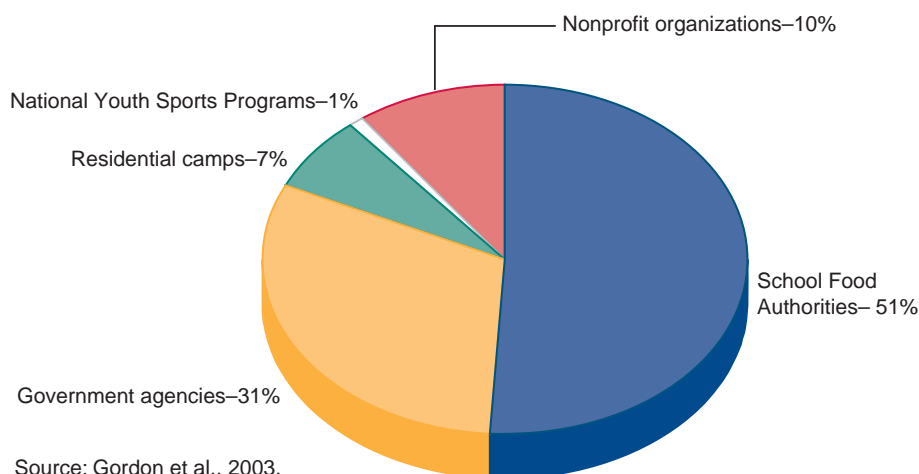
An important aspect of the National School Lunch Program is that low-income children can receive lunches free or at a reduced price. In the late 1980s, USDA introduced the policy of direct certification for free meals. Previously, all families who wished their children to receive free or reduced-price meals had to complete an application and provide data on family size and income. Under direct certification, school districts use information from State welfare or food stamp offices to certify children to receive free meals instead of requiring families to fill out applications. Direct certification was designed primarily to improve program access and administrative efficiency. Gleason et al. (2003) examined the prevalence of direct certification, its implementation methods, and its effects on program access and integrity. About 61 percent of school districts used direct certification in the National School Lunch Program in the 2001-02 school year, the same share as in 1996. About 18 percent of all students certified for free meals were directly certified. Direct certification increased the number of children certified for free meals by about 400,000 and slightly increased overall participation in the National School Lunch Program. The study was instrumental in the child nutrition reauthorization bill of 2004, which emphasized the use of direct certification to increase both program access and integrity.

### **School food policies affect students' dietary behaviors**

A study of several Houston, TX, middle schools found that, after chips, candy, dessert foods, and sweetened beverages were removed from the schools' snack bars, students' consumption of milk increased while

Figure 3-2

### **Summer Food Service Program meals served by type of sponsor** *School districts served over half of all meals*



Source: Gordon et al., 2003.

consumption of sweetened beverages declined (Cullen et al., 2006). While chip consumption from the snack bar decreased after the policy change, consumption of chips and candy from school vending machines increased. The results indicate that while policy changes that affect foods sold in schools can result in changes in student consumption from the targeted environments, compensation may occur if all food environments do not make similar changes.

### **FANRP sponsored first major study of the Summer Food Service Program in 15 years**

When school is not in session, the Summer Food Service Program is the major Federal resource available to provide children from low-income families with nutritious meals. The program, which served 2.1 million children in 2001, is small in comparison with the National School Lunch Program, which served 15.5 million children that year. Growing interest in improving Summer Food Service Program operations and expanding participation led FANRP to commission the first comprehensive examination of the program since 1986. The study found that in fiscal year 2001,

more than 4,000 local sponsors provided about 130 million meals at more than 35,000 feeding sites (Gordon and Briefel, 2003). On average, meals provided the levels of key nutrients recommended for school meals. However, breakfasts were slightly lower in food energy than recommended, and lunches were higher in fat. Half the program sponsors were school districts, which operated about half the sites and served about half the meals (fig. 3-2). Other sponsors included government agencies, private nonprofit organizations, and residential camps. Most site supervisors reported they could serve more children, but that various barriers, such as lack of transportation, may be reasons why more children do not participate in the program.

### **Mandated tiering refocuses CACFP benefits on low-income children**

A 1995 study of the family child care homes portion of the Child and Adult Care Food Program (CACFP) found that nearly 80 percent of children served came from middle and higher income families. At that time, all meals served in CACFP child care homes received the same reimburse-

ment rate irrespective of the child's family income. To refocus the program on low-income children, the Personal Responsibility and Work Opportunities Reconciliation Act of 1996 mandated an income-targeted meal reimbursement structure and called for a study of its effects. A key finding from the report to Congress was that the family child care homes component of the CACFP became substantially more focused on low-income children after tiering was introduced (Hamilton et al., 2002). The share of meal reimbursement dollars for meals served to children with household incomes at or below 185 percent of the Federal poverty guideline doubled from 21 percent in 1995 to 45 percent in 1999 (fig. 3-3). Although tiering reduced the number of family child care homes participating in the program, it did not alter the number or nutritional quality of meals offered by them.

**CACFP sponsors report administrative costs exceeding allowable reimbursements**

While tiering was successful in refocusing CACFP family day care home

funding to serve low-income children as intended by Congress, the system created additional duties for CACFP sponsors that oversee those homes. This situation raised concerns as to the adequacy of reimbursements for sponsors' administrative expenses. The decline in the number of CACFP sponsors – a 6-percent drop between 1995 and 2001 – further added to the concern. To address the issue, Pettigrew et al. (2006) explored the administrative cost reimbursement system for CACFP sponsors and found that costs reported by sponsors on average were about 5 percent higher than allowable reimbursement amounts.

**Behavioral economics identifies options for improving students' diets**

A study by Just et al., (2007) incorporated findings from behavioral economics, food marketing, and psychology to improve our understanding of food decisions and to identify possible options for improving the diets and health of participants in the food and nutrition assistance programs, including the school meals programs. For example:

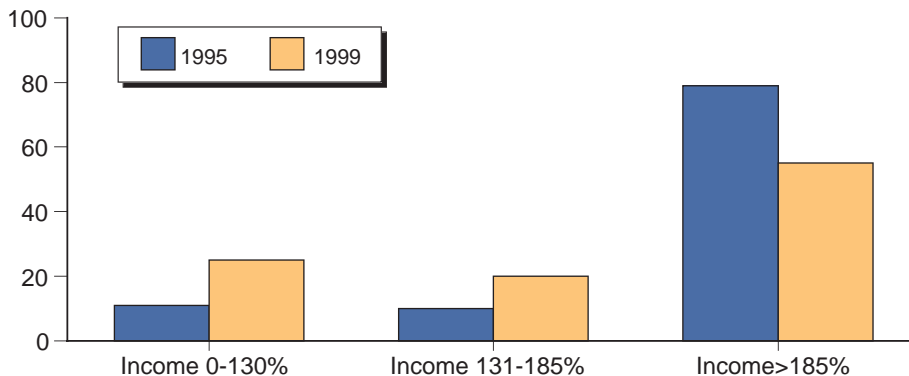
- People have problems of *self-control* when choosing food, either because they prefer immediate gratification or because they are under the influence of a visceral factor, such as feeling hungry. Letting students preselect menu options in the school meal programs may improve the healthfulness of their food choices.
- People place more weight on *default options*. Making the default menu option of school meals more healthful, such as a fruit salad instead of French fries, may increase the likelihood that they will choose more healthful foods.
- Food decisions are often based more on emotion than rational thought. *Impulsive behavior*, such as choosing less healthy foods over healthier foods, may result from how the food is presented. Drawing attention to more healthful foods – by making them more accessible or displaying them more prominently in school cafeterias – might mitigate the effects of a distracting environment and increase the likelihood that students choose more healthful menu options.
- *External cues* can have a major effect on the food selected, the amount consumed, and the eater's perception of how much was consumed. Noise levels, lighting, and distractions, as well as the size and shape of foods and food containers, affect how much people eat. Reducing the number of students seated at each table or making school cafeterias more brightly lit are possible options that might help students better monitor their actual consumption.

Figure 3-3

**Allocation of Child and Adult Care Food Program meal reimbursements by participant income as percent of poverty**

*The introduction of tiered reimbursements concentrated program benefits more intensely on low-income children*

Percent of meal reimbursement dollars



Source: Hamilton et al., 2002.

# WIC PROGRAM RESEARCH



The Special Supplemental Nutrition Program for Women, Infants, and Children (WIC) is one of this country's key food assistance programs. Each month, WIC serves over 8 million low-income, pregnant, breastfeeding, and postpartum women, as well as infants and children up to age 5 who are deemed to be at nutritional risk. The program provides three types of benefits:

- 1) a package of supplemental foods
- 2) nutrition education (including breastfeeding promotion and support)
- 3) health care referrals.

The supplemental foods are usually provided to participants through vouchers for retail purchase of specific foods approved by the program.

### Research Highlights

#### ***Assessing Diet, Health, and Other Program Outcomes***

WIC is based on the premise that early nutrition intervention during times of critical growth and development will not only improve the health status of participants, but will help prevent later health problems. Highlights of FANRP research examining WIC's impact on participants include:

## Research Summary

FANRP has been an important source of information on the WIC program. A FANRP-sponsored review of food and nutrition assistance literature concluded that most of the studies of WIC's impact on nutrition and health suggest that WIC participation leads to improved birth outcomes and increases children's iron status and nutrient intake. However, these studies tend to be fairly old, capturing a program that is considerably different from today's program. Research on WIC's impact on some participant groups, such as women, is scarce. FANRP research has been instrumental in improving our understanding of how WIC operates, especially in the area of cost-containment. Several FANRP studies have not only informed, but have led to policy changes, for example in the methodology for estimating the number of people eligible for WIC and in allowable nutrition risk criteria.

### ***Most research prior to 2004 suggests that WIC has a positive impact on birth outcomes***

A comprehensive literature review of WIC's impact on participants' health concluded that research published prior to 2004 was strongly suggestive of a positive impact on birthweight and a number of other birth-related outcomes associated with WIC participation during pregnancy and significantly lower birth-related Medicaid costs (Fox et al., 2004). However, various empirical problems—such as unobserved differences between women who choose to participate in the program and those who choose not to participate even though eligible—make it difficult to determine the magnitude of WIC's contribution to the observed differences in outcomes.

### ***Research questions WIC's effect on birthweight***

There has been a debate in recent years over how a pregnant woman's participation in WIC affects her baby's birthweight, an outcome affirmed by prior research. A controversial study of women on Medicaid in New York City from 1988 to 2001 found no relationship between prenatal WIC participation and measures of fetal growth among singletons although there was a strong pattern of association between WIC and preterm births

among U.S.-born Black twins (Joyce et al., 2005). The authors concluded that mothers' prenatal participation in WIC had relatively little impact on infant health in New York City during the study period.

### ***WIC affects children's consumption of some kinds of food***

In the first study to examine in detail children's consumption of the types of foods contained in the WIC food packages, Oliveira and Chandran (2005) found that "WIC-approved foods" are an important part of children's diets, accounting for at least one-quarter of the total calories consumed by children. The study provided strong evidence that participation in WIC increases the consumption of at least some types of "WIC-approved foods," namely 100-percent fruit and vegetable juices and low-sugar cereals, and decreases the consumption of "non-WIC" beverages such as soft drinks. The study also found significant differences in the consumption of "WIC-approved foods" by race/ethnicity and geographic regions, suggesting strong cultural and regional dietary patterns. These results highlight the importance of providing in the WIC food packages specific foods that are most likely to improve the dietary patterns of WIC participants.

### ***WIC improves children's iron status and increases children's nutrient intake***

Previous research suggests that WIC participation improves children's iron status, and, based in part on several recent FANRP studies, increases children's intake of selected nutrients (Fox et al., 2004). However, because the methodology to assess the adequacy of nutrient intake postdates these studies, it is unclear whether these increases in nutrient intake are associated with any "benefits," such as increased proportion of WIC children with adequate nutrient intakes.

### ***Participation in WIC reduces the risk of child abuse or neglect***

Lee et al. (2006) examined the relationship between WIC participation and young children's health and mistreatment outcomes. Participation in WIC, either separately or jointly with participation in the Food Stamp Program, was found to reduce the risk of child abuse or neglect and several nutrition-related health problems, such as anemia, failure to thrive, and nutritional deficiency. These findings are significant because they offer some evidence that the family support provided by participation in programs such as WIC and the Food Stamp Program may protect children from abuse and neglect although the programs are not directly intended to do so.

### ***Important information gaps remain regarding WIC's impact on some participant groups***

Research on WIC impacts on pregnant women and breastfeeding and non-breastfeeding postpartum women is scarce and relatively dated (Fox et al., 2004). There is also no solid evidence about the impact of WIC on the initiation and duration of breastfeeding.

### ***Nutrition education had minimal impact on WIC participants' food purchasing behavior***

Nutrition education is a key component of the WIC program. Federal regulations require the WIC program to offer at least two nutrition education contacts to the participant during each certification period. However, the effect of nutrition education on participants' food consumption behavior is difficult to ascertain. Bell and Gleason (2007) examined whether WIC clients in Washington State changed their food purchasing behavior related to the fat content of milk and cheese after receiving nutrition education directed at encouraging the purchase of 1-percent and skim milk, as well as low-fat cheese, in order to prevent and reduce obesity. The researchers found no significant change in purchasing patterns among the study participants after the nutrition education intervention. Focus group participants explained that taste preference, pressure from family members, and historical purchasing patterns influenced their choice of milk or cheese more than WIC nutrition education. The results point out the difficulty of changing food consumption behavior.

### ***Program Access and Participation***

WIC is a discretionary grant program funded annually at a specific grant level determined by Congressional appropriations. As a result, the number of eligible people who can participate depends on the annual appropriation and the cost of operating the program.

### ***Errors in previous estimation methods resulted in an underestimate of persons eligible for WIC***

To help inform budgetary decisions for WIC, USDA estimates the number of individuals who are eligible to participate and who choose to participate if the program is fully funded (i.e., if there are sufficient funds to serve all who are eligible and wish to participate). The accuracy of these estimates is important. Since eligible people can participate in the program only to the extent that funds are available, underestimating the number of people eligible and likely to participate in WIC could result in some eligible persons not being able to receive WIC benefits. On the other hand, overestimating the number of people eligible and likely to

participate may unnecessarily limit appropriations to other important programs. Reported participation rates greater than 100 percent among some WIC participant groups in the 1990s raised concern about the program's integrity (i.e., that more people participated than were eligible) and questions about how program eligibility was estimated. In response, FANRP sponsored a study by the Committee on National Statistics of the National Research Council to review the methods used to estimate the national number of people eligible and likely to participate in WIC under full funding. After concluding that flaws in the estimation method resulted in an underestimate of eligibility, the Committee made several concrete recommendations for improving the estimation procedures which have since been incorporated into the estimates (National Research Council, 2003). The improved estimates show participation rates below 100 percent for all WIC participant groups, alleviating many of the concerns about program integrity.

### ***Women in poor health are more likely to participate in WIC earlier***

Increasing the proportion of pregnant women who join WIC early in their pregnancy is important because previous research suggests that earlier participation improves birth outcomes. Swann (2007) found that women with low income, low education, no insurance, and poor health participate in WIC earlier than other women. Automatic WIC eligibility for Medicaid recipients was associated with earlier WIC participation for women experiencing their first pregnancy. WIC participation during a first pregnancy was strongly correlated with earlier WIC participation during a second pregnancy. Thus, outreach toward women pregnant for the first time may be particularly important.



National Dairy Council/Dairy Management Inc.



## Program Administration

Because food costs account for about three-quarters of the total cost of the WIC program, State WIC agencies have implemented a number of practices designed to contain food costs. FANRP research has provided important insights on these cost-containment practices and other program operation issues.

### Retail markup accounts for most of the cost to WIC of providing infant formula

The primary WIC cost-containment practice is the use of infant formula rebates. Typically, WIC State agencies obtain discounts in the form of rebates from infant formula manufacturers. As a result of the rebates, the cost to WIC for each can of formula provided through the program has two components: 1) net wholesale price, which is equal to the wholesale price of formula minus the amount of the rebate; and 2) retail markup (fig. 4-1). Oliveira and Davis (2006) found that the retail markup accounts for most (about 60 percent) of the cost to WIC of infant formula in most States. However, both retail markup and net wholesale price have increased over time. Since WIC is a discretionary program with fixed funding, higher costs mean that fewer persons will be served (or that additional funds need to be appropriated).

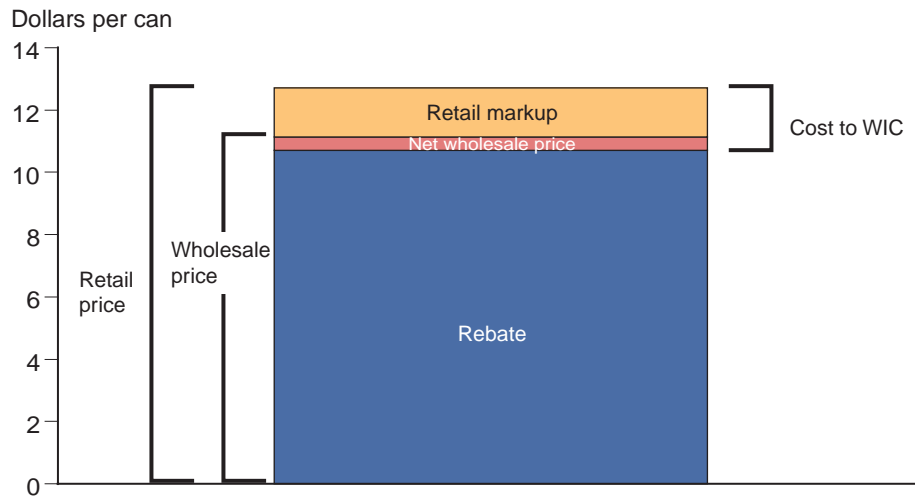
### Other WIC cost-containment practices result in substantial food cost savings as well

WIC agencies have implemented cost-containment practices in addition to infant formula rebates. These practices include limiting authorized food vendors (such as supermarkets and grocery stores) to outlets with lower food prices; limiting food-item selection according to brand, package size, form, or price (for instance, only

Figure 4-1

### Relationship of infant formula rebate, net wholesale price, and retail markup for can of powdered formula

Rebates significantly reduce the the costs of infant formula to the WIC Program



Note: Example based on a 12.9 oz-can of Ross Similac Advance with iron (powder) in the California WIC program during the 2nd quarter of 2004.

Source: Oliveira and Davis, 2006.



Victor Oliveira, USDA/ERS

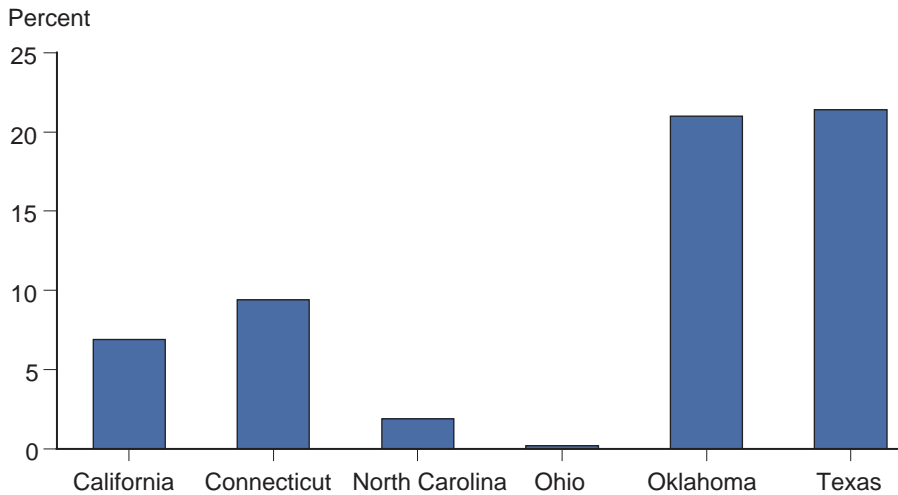
allowing generic cereals or requiring purchase of least-cost items); and negotiating rebates with food manufacturers or suppliers. Concerns have been raised that if cost-containment policies are overly restrictive, then WIC participants' access to and consumption of prescribed foods may be reduced. Some have also questioned whether cost-containment prac-

tices save enough in food costs to offset their additional administrative costs. A congressionally mandated study to assess the impacts of WIC cost-containment practices (other than the use of infant formula rebates) found that the cost-containment practices resulted in substantial food cost savings (reducing food costs by an average of 15 percent), had few

Figure 4-2

### Estimated food cost savings from cost-containment practices by State

Cost-containment practices reduced average food package costs by 0.2 to 21.4 percent depending on practices implemented



Source: Kirlin et al., 2003.

adverse impacts on WIC participants, and were relatively inexpensive to manage and operate (Kirlin et al., 2003) (fig. 4-2). The six-State study, the first to examine the balance struck by WIC between the goals of nutritional improvement and customer satisfaction and the need to make the most of available program funds, provides strong evidence that cost-containment practices can be effective without jeopardizing WIC program goals.

#### Prices drive interstate variations in WIC food costs

Although the average monthly per-participant cost of providing WIC foods varies markedly across the States, little is known about the factors behind these differences. For example, to what extent are these cost variations due to factors under a State's control—such as cost-containment practices—or due to factors outside of a State's control—such as the proportions of enrollees qualifying for different foods, or differences in food prices? If all interstate food-cost variation was caused by differing policies, then policies in low-cost States could

provide cost-cutting insights for high-cost States. Davis and Leibtag (2005) found that variations in food prices played the largest role in the differing costs of WIC food packages from State to State; the differing composition of participants (e.g., infants, breastfeeding, pregnant, or postpartum women) played a much smaller role.

#### WIC eligibles may be presumed to be at risk of failing to meet dietary guidelines

To be eligible to receive WIC benefits, applicants must meet one of several nutrition risk criteria, one of which is dietary risk. The role of dietary risk in establishing eligibility for WIC is crucial, since many children and postpartum women are found to meet the nutritional risk criteria solely on the basis of dietary risk. FANRP sponsored a study by the Institute of Medicine (2002) that evaluated the use of various dietary assessment tools and concluded:

- 1) commonly used dietary assessment methods (e.g., 24-hour Dietary Recalls, and Food

Frequency Questionnaires) are not appropriate for determining nutrient deficiencies in individuals and for WIC eligibility purposes,

- 2) nearly all low-income women in the childbearing years and children ages 2 to 5 are at dietary risk and may benefit from WIC services and may be presumed to meet the nutrition risk requirement through the category of dietary risk based on failure to meet Dietary Guidelines.

Based on the report's recommendations, USDA's Food and Nutrition Service (FNS) discontinued the use of 24-hour Dietary Recalls and Food Frequency Questionnaires to quantify diet in order to determine WIC eligibility.

#### Maternal overweight becomes new risk criterion

Better understanding what risk factors at birth are associated with the development of childhood obesity could help to identify children who are in need of early obesity prevention efforts. Whitaker (2004) found among low-income children, maternal obesity in early pregnancy more than doubles the risk of a child's being obese at 2 to 4 years of age. Early results from this study contributed to WIC officials' implementing a new WIC nutritional risk criterion, titled "at risk for overweight" related to mother's obese weight status. This new criterion permits income-eligible children to be certified for WIC if they are born to mothers who were obese in early pregnancy.

### ***The original nutrients targeted by WIC are no longer lacking in the diets of most U.S. preschoolers***

WIC food packages were designed in the early 1970s to include foods rich in nutrients that were lacking in the diets of the target population – protein, calcium, iron, and vitamins A and C. However, since the initial development of the WIC food packages, U.S. food consumption patterns and dietary standards have changed, the prevalence of overweight and obesity has increased, and the WIC population has become more ethnically diverse. According to two FANRP-sponsored studies, it appears that of the original nutrients targeted by WIC, protein, calcium, vitamin A, and vitamin C are no longer lacking in the diets of infants and preschool children in the United States (Devaney et al., 2005, and Cole and Fox, 2004b). Most infants and preschool children also appear to consume adequate amounts of iron, although biochemical indicators suggest some children are still iron-deficient. Overconsumption of calories may be a problem for both WIC and non-WIC children and inadequate consumption of vitamin E and magnesium also appears to be a problem for many children.

### ***Fruit and vegetable vouchers prove successful***

In recent years, there has been considerable discussion of the possibility of adding fresh fruits and vegetables to the WIC food packages, given their role in optimizing diets. A study by Herman et al. (2006) investigated the effects of providing postpartum WIC women with supplemental vouchers specifically for the purchase of fresh fruits and vegetables, at either a local supermarket or nearby farmers' market. The study found a high redemption rate of the vouchers (nearly 90 percent) for the purchase of a wide variety of fresh fruits and vegetables. No particular barriers to voucher redemption by either participants or retail vendors were reported. These findings were used by the Institute of Medicine's Committee to Review the WIC Food Packages to support their recommendation that WIC participants be given a cash voucher for the purchase of fresh fruits and vegetables in supermarkets.

### ***State and local WIC agencies use a range of innovative practices***

State and local WIC agencies are constantly developing and testing new and improved ways of delivering services. Gordon et al. (2004) identified and examined a range of innovative

practices at 20 State or local WIC agencies. Their study focused on WIC practices in three main areas:

- 1) breastfeeding promotion and support (including peer counseling and extensive support programs for high-risk groups),
- 2) nutrition and health education (including obesity prevention, preventive health care, and staff training),
- 3) service delivery (including delivery in nontraditional settings such as in clients' home and workplaces).

A number of the programs serve high-risk groups such as teenagers, premature infants, immigrants, and those with alcohol or drug abuse problems. For each innovative program, the report provided background information and discussed the source of the innovation, key challenges, implementation lessons learned, evidence of its success, and the feasibility of replicating the practice.

### ***Breastfeeding results in significant savings***

Mothers who participate in the WIC program are encouraged to breastfeed their infants if possible. In a review of studies conducted in the United States to assess the economic benefits of breastfeeding, Weimer (2001) found that a minimum of \$3.6 billion would be saved if the prevalence of babies being breastfed exclusively increased from 1996 rates to those recommended by the Surgeon General by 2000. This figure reflected approximately \$3.1 billion attributable to preventing childhood illnesses and premature deaths, and an additional \$0.5 billion in annual savings associated with reducing traditional medical expenditures (for example, doctors' or hospital visits, laboratory tests, among others) and indirect costs, such as lost earnings of parents caring for sick children.



## LINKAGES WITH THE ECONOMY

Food and nutrition assistance programs are intrinsically linked to the economy. That is, the health of the general economy affects the use of USDA's food assistance programs. Conversely, food assistance programs affect industry and the general economy. FANRP studies have shed considerable light on this two-way relationship between the food and nutrition assistance programs and the economy.

### Research Highlights

#### ***Economic Conditions Impact the Food Assistance Programs***

Economic conditions affect participation in and spending on food and nutrition assistance programs through their influence on the size of the eligible population, the rate of participation among eligible people, and benefit levels.

#### ***Food stamps stabilize the economy***

As a means-tested entitlement program, the Food Stamp Program automatically responds to changes in the need for assistance. Caseloads tend to rise during recessionary periods and fall during economic expansions (fig. 5-1). Hanson and Gundersen (2002), summarizing a number of FANRP studies, found that a 1-percentage-point increase in the national unemployment rate—a key indicator of the health of the general economy—results

**UNEMPLOYMENT  
INSURANCE**

**Information  
for Claimants**

*Guide for Persons  
Claiming Benefits*

## Research Summary

FANRP's economic perspective has brought attention to the interrelationship between USDA's food assistance and nutrition programs and the economy. The interrelationship between food stamp caseloads and the unemployment rate is perhaps the best known example. FANRP has greatly expanded our knowledge of this relationship and has shown how it varies by type of household. The Food Stamp Program's response to economic hardships caused by natural disasters such as the 2005 Gulf Coast hurricanes is another example where food assistance programs respond to public needs. In addition, countercyclical changes in food stamp expenditures can have beneficial stabilizing effects on the economy. And by generating additional food consumption, the child nutrition programs increase production, value added, and jobs on U.S. farms. However, the food assistance programs can also have unintended economic consequences on non-participants. For example, WIC increases the demand for infant formula and hence slightly raises the price of infant formula for non-WIC consumers.

in about 700,000 more food stamp recipients during the first year and about 1.3 million additional recipients in the long run. The additional program benefits help to stabilize the overall economy and to direct Federal spending to areas most in need of assistance when the economy turns downward and unemployment rises.

### *Type of household influences the relationship between the unemployment rate and food stamp caseloads*

Kornfeld (2002) found that a 1-percentage-point increase in the unemployment rate led to an 11-percent increase in the number of food stamp recipients in families with multiple adults and children and with adults living separately, but only a 1-percent increase in families with single adults with children during the 1990s. Families with multiple adults and children and adults living separately include many nondisabled adults whose economic status and program eligibility are closely tied to current economic conditions. On the other hand, the economy had a less direct effect on households whose members have a more limited attachment to the labor force, such as the disabled and single adults with children.

### *Economic hardships caused by natural disasters can significantly increase the demand for food stamps*

In the fall of 2005, Hurricanes Katrina, Rita, and Wilma devastated areas along much of the U.S. Gulf Coast. Although the Federal response to the disasters received much attention, information about food stamp use provided in a recent FANRP study helped to provide a more complete picture of the use of public assistance following the hurricanes (Hanson and Oliveira, 2007). The resulting physical and economic effects of the hurricanes, including increased costs incurred for repairs and reconstruction, and loss of jobs and income,



USDA/FNS

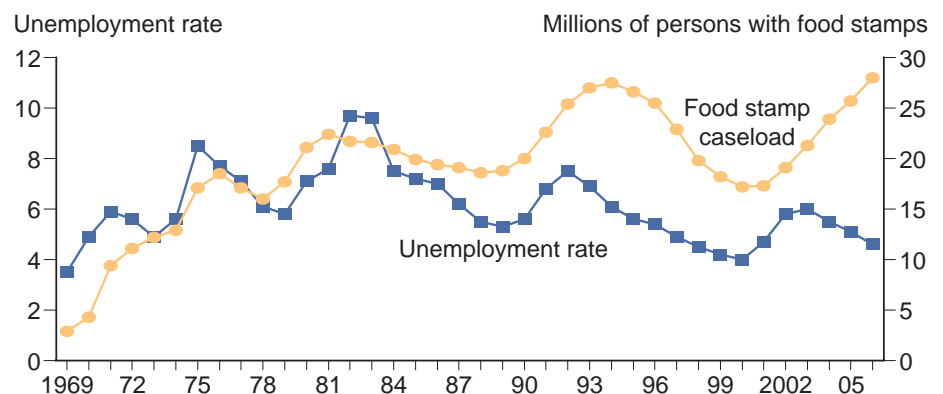
increased total food stamp benefits issued by about \$1.2 billion, with most of it going to persons located in the 5 Gulf Coast States of Florida, Alabama, Mississippi, Louisiana, and Texas (fig. 5-2). Other States that received large numbers of evacuees from hurricane-impacted areas also experienced disproportionate increases in food stamp caseloads. The analysis suggests that, by February 2006, the effect of the disasters on food stamp caseloads and benefits issued at the national level had largely dissipated, even though some individuals and local areas may have experienced disaster-related employment and economic hardships for longer periods.

### *Food Assistance Programs Affect Economic Activity*

Food and nutrition assistance programs increase food consumption. The new demand for food affects the production, income, and employment of food processors, agriculture, and other sectors of the economy.

Figure 5-1

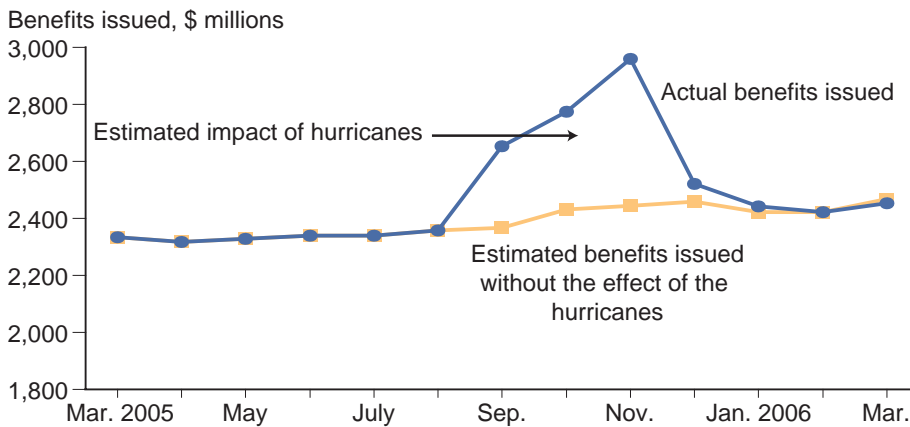
### **Food Stamp Program caseloads and the unemployment rate**



Source: Bureau of Labor Statistics and the Food and Nutrition Service, USDA.

Figure 5-2

**Estimated impact of the 2005 Gulf Coast hurricanes on food stamp benefits issued**



Source: Hanson and Oliveira, 2007.

**Stabilizing effects of Food Stamp Program depend on how the program is financed**

The Food Stamp Program is one of the Federal Government’s primary countercyclical assistance programs, providing assistance to more households during a recession and to fewer households during an economic expansion. These countercyclical changes in food stamp expenditures can also have beneficial stabilizing effects on the economy, stimulating economic activity during a recession and slowing demand during an expansion. However, the extent of the program’s economywide stabilizing effect depends on how the program is financed (Hanson and Golan, 2002). The Food Stamp Program provides an economic stimulus during a recession when the Government finances the increase in program expenditures through budget deficit or emergency financing. If the same recession-driven increase in food stamp benefits is financed through increased taxes or a budget-neutral means, the stimulus effect of the increase in expenditures does not occur.

**A cut in food stamp benefits will lead to reductions in food demand and farm production**

Because food assistance programs generate demand for food and farm products, changes in food assistance policy can have impacts on economic activity and household income across the economy. Using an econometric model that provides policymakers with a mechanism for examining the economy-wide distributional impact of potential policy changes, Hanson et al. (2002) found that a hypothetical budget-neutral cut in food stamp benefits leads to reductions in food demand and farm production. Specifically, a \$5-billion cut in food stamp benefits leads to decreases in farm and food processing production of approximately \$1.3 billion and 7,500 jobs lost. On the other hand, a \$5-billion increase in food stamp benefits leads to increases in farm and food processing production of approximately \$1.3 billion and 7,500 jobs gained.

**Child nutrition programs generate additional farm cash receipts**


USDA’s child nutrition programs generate additional food consumption, which increases production, value added, and jobs on U.S. farms (farm

“value added” is a measure of labor earnings and the returns to farm ownership). Estimated impacts depend in part on the program’s additionality—the amount by which a dollar of program spending results in additional food consumption. Additionality takes into account the amount of food that would have been purchased anyway, that is, even without the programs. The “additional” \$2.3 billion to \$3.1 billion of food expenditures due to the child nutrition programs, including WIC, in 2001, generated \$1 billion to \$1.5 billion of additional farm cash receipts (Hanson, 2003).

**WIC increases the retail price of infant formula**

The WIC program provides an example of how a food assistance program can have an economic impact on nonparticipants through the price of program commodities. WIC purchases over half of all infant formula sold in the United States. Because of its buying power, WIC gets large discounts in the form of rebates from infant formula manufacturers. These rebates, which ranged from 85 to 98 percent of the manufacturer’s wholesale price in fiscal year 2000, support about one-quarter of all WIC participants. Based on the most comprehensive national study of infant formula prices at the retail level ever conducted, Oliveira et al. (2004) found that WIC and its rebate program slightly raised the supermarket price of infant formula, especially in States with a high percentage of infants participating in WIC. That is, while WIC and its infant formula rebate program have been successful in terms of making infant formula available to needy infants at a low monetary cost, an indirect effect of the program is higher retail prices for non-WIC consumers.

## INCOME VOLATILITY



Household income volatility in the form of month-to-month changes in income has important implications for food and nutrition assistance programs. Because the programs have monthly income eligibility criteria, fluctuations in income can cause some families to cycle in and out of eligibility. The combination of means-testing and volatile income affects eligibility requirements, certification periods, and certification error rates. Understanding the implications of income volatility on food assistance programs is particularly important if the programs are to effectively serve the needy.

### Research Highlights

#### *Income Volatility and Food Stamps*

The Food Stamp Program is the principal food and nutrition assistance program. It is especially important to understand the program's effect on stabilizing fluctuations in household income and food consumption.

#### *Food stamps reduce income volatility and stabilize food consumption*

Gundersen and Ziliak (2003) examined the effect of food stamps on income and food-consumption volatility. Treating food stamp benefits like income, food stamps reduced income volatility across all families by about 3 percent and, in turn, reduced food-

## Research Summary

FANRP research has informed understanding of the causes and impacts of income volatility. Income volatility is especially high for poorer households. This volatility causes low-income families to cycle in and out of eligibility for food assistance and may affect food insufficiency. Employment factors, such as total hours worked by household members, are a major cause of income volatility. Food stamps reduce the effects of income volatility on the household and stabilize food consumption. Because of income volatility, the risk of food stamp errors, whereby wrong benefit amounts are received, increases with the length of the certification period. While short recertification periods reduce error rates, they also reduce participation in the Food Stamp Program.

consumption volatility by about 4 percent. More importantly, the stabilizing role of food stamps on income and food consumption was much more pronounced among those most in need (i.e., families with high probabilities of food stamp participation), where food stamps were found to reduce volatility by 12 and 14 percent, respectively.

### ***Nonparticipant households are more likely to experience short-term drop in income than participant households***

The dynamics of household income are an important factor in Food Stamp Program participation decisions. Farrell et al. (2003) found that eligible nonparticipant households experienced substantially more variability in their monthly income and earnings than did participant households. In particular, many nonparticipant households had a short-term drop in income. That is, while current reported household income was low enough to meet the income test in a given month, this was a transitory phenomenon. This result is consistent with the premise that expectations of higher future income explain why some nonparticipant households do not participate.

### ***The food stamp cycle impacts food intake patterns***

Wilde and Ranney (2000) were the first to use nationally representative

data to examine the food stamp cycle—monthly cycles in food expenditures and food intake among food stamp households. Average food spending by food stamp households was found to peak sharply in the first 3 days after food stamps were received. Food energy intake patterns differed by how frequently the food stamp household made major grocery shopping trips. For food stamp households that shopped frequently, food energy intake remained steady over the course of the food stamp month, ranging from about 78 percent of the RDA to about 81 percent. However, for the 42 percent of all food stamp households who conducted major grocery shopping trips only once per month, mean food energy intake dropped significantly, from 83 percent of the RDA in the first week to 73.4 percent of the RDA in the fourth week. This cycle of food spending leaves some households with less food intake late in the month. These results suggest that bimonthly delivery of food stamp benefits may mediate the intake cycle.

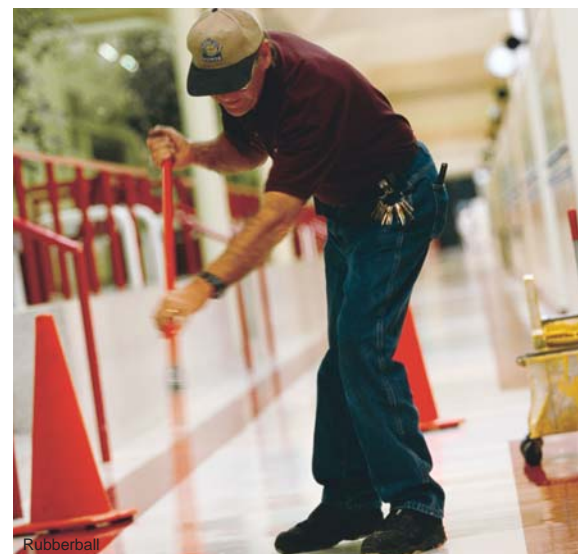
### ***Short recertification periods reduce error rates but decrease program participation***

States are required to recertify most food stamp participants at least once a year. In the late 1990s, many States increased their use of short recertification periods (3 months or less) in an

effort to lower the rate of error in determining food stamp benefit amounts. The rationale for doing this is that more the frequent review of client circumstances results in a more timely reassessment of eligibility and adjustment of benefits. This reduces risk of error, especially for households with volatile incomes. But reducing errors in this manner creates additional burden for clients who must appear for an interview and provide documentation. This additional effort on the part of clients may discourage participation by eligible households. Thus, there is a tradeoff between lowering errors rates and encouraging program participation. Kabbani and Wilde (2003) found that short recertification periods reduced States' error rates and that greater use of short recertification periods was associated with lower food stamp participation rates. They estimated that using short recertification periods to reduce error rates for working households by 1-percentage point would result in a 3.4-percent decline in participation rates for these households.

### ***Income Volatility and Other Food Assistance Programs***

FANRP has also contributed to an understanding of the implications of income volatility for the National School Lunch Program and WIC.





### ***Income volatility helps to explain “overcertification” in the National School Lunch Program***

Newman (2006) looked at how month-to-month changes in income volatility among households with children affected eligibility for free and reduced-price lunches in the National School Lunch Program. Prior to recent changes in program regulations, such income volatility meant that children in these households moved back and forth across the program’s eligibility threshold. Eligibility status in almost one-third of all households changed within a year (fig. 6-1). For households with income below 185 percent of poverty – the eligibility threshold for a reduced-price lunch – two-thirds had income above the threshold in at least 1 month that year. An estimated 27 percent of households that were income eligible for subsidized lunches at the beginning of the school year were no longer income eligible for the same level of subsidy by December due to monthly income changes. These month-to-month changes could feasibly explain a large portion of the estimated overcertification rates under the prior rules.

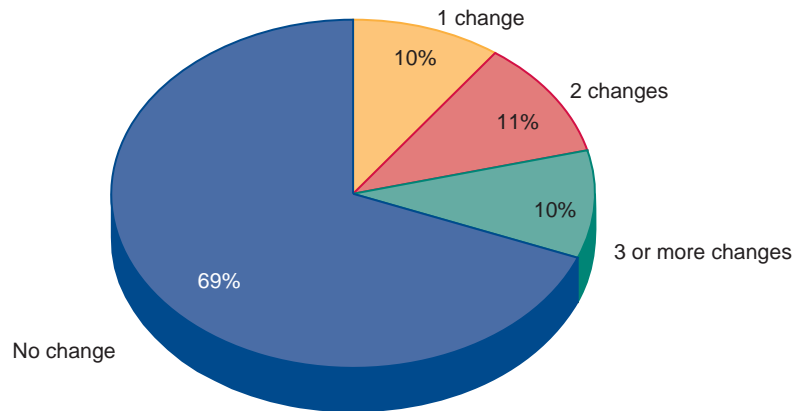
### ***Employment factors are associated with income volatility***

Newman (2006) found that among households with children, the lower a household’s income, the more likely it is to face volatile swings in monthly income. For example, the monthly income variation for households below 75 percent of annual poverty was double that of households above 300 percent of annual poverty. The most important factors associated with exit from or entry into eligibility for reduced-price school meals (i.e., an increase or decrease in income relative to 185 percent of poverty) were similar. In both cases, changes in total household hours worked and in the share of adults working were the most

Figure 6-1

### **Number of changes in National School Lunch Program eligibility status among all households, 1996-97**

*Eligibility status changed in one-third of all households within a year*



Source: Newman, 2006.

likely to lead to exit or entry. The results point to the importance of the labor market participation of all household members as a source of short-term income volatility.

### ***Income variability has implications for eligibility in the WIC program***

To receive WIC benefits, applicants must live in a family with income less than or equal to 185 percent of the Federal poverty guidelines (or they must be enrolled in certain means-tested transfer programs). Income eligibility is checked only at enrollment and periodic recertification intervals. Once they are enrolled, infants are certified for 12 months of eligibility while children are certified for 6 months. A study conducted by the National Research Council (2003) concluded that because of the variability of income over the course of the year, especially around the birth of a child, a significantly greater number of people are eligible for WIC based on monthly income eligibility versus annual income. For example, compared with the use of annual income, 50 percent more infants and 35 percent more children may be income eligible for WIC based on

monthly income and certification periods.

### ***Income Volatility and Food Insufficiency***

#### ***Food-insufficient households have a greater variance of income***

Gundersen and Gruber (2001) examined the relationship between income volatility and food insufficiency (defined as “sometimes or often did not get enough to eat”). While low average income is an intuitively appealing explanation for food insufficiency, the coexistence of food-sufficient households with incomes below 50 percent of the poverty line and food-insufficient households with incomes above 150 percent of the poverty line is evidence that mean income and food insufficiency are not perfectly correlated. Results of the study indicate that food-insufficient households were disproportionately likely to suffer from income shocks associated with the loss of earnings or food stamps. Food-insufficient households were also shown to experience a greater variance of income, measured as a proportion of mean income, than food-sufficient households.

# WELFARE REFORM



The Personal Responsibility and Work Opportunity Reconciliation Act of 1996 (PRWORA) dramatically changed the Nation’s cash welfare system. PRWORA, also known as the Welfare Reform Act, eliminated the entitlement program Aid to Families with Dependent Children (AFDC) and replaced it with Temporary Assistance for Needy Families (TANF), which is funded through block grants to States. Designed to reduce long-term welfare dependency by increasing self-sufficiency, PRWORA emphasized a “welfare to work” concept, imposing time limits and work requirements as a condition of TANF assistance, and gave States greater flexibility in designing their welfare policies.

PRWORA also included major reforms to the Food Stamp Program. The act reduced benefits, eliminated benefits for most groups of legal immigrants, and tightened work requirements for able-bodied adults without dependents (ABAWDS) age 18 to 50. The act also increased State flexibility in running the Food Stamp Program. For example, it allowed States to establish a “simplified food stamp program” to help align Food Stamp Program rules with TANF rules. Although PRWORA reduced food stamp benefits per person and introduced certain restrictions in eligibility, reductions to AFDC/TANF left the Food Stamp Program as one of the only remaining entitlement programs available to most low-income households, thereby increasing its importance in the social safety net.

## Research Highlights

### ***Effect of Welfare Reform on Food Stamp Caseloads***

In the years immediately following PRWORA, food stamp caseloads dropped dramatically (for example, between fiscal years 1995 and 2000, food stamp caseloads declined by 35 percent). At the same time, the U.S. economy was expanding, making it difficult to separate the effects of policy changes from effects due to the economy. FANRP funded several studies to examine the relative effects of welfare reform and the strong economy on the drop in caseloads.

### ***The expanding economy was a major factor explaining the decline in food stamp caseloads***

Results from a number of FANRP studies indicate that welfare reform was of lesser importance in explaining the decline in food stamp caseloads than was the expansion of the U.S. economy. For example, a study by Figlio et al. (2000) suggests that macroeconomic conditions, as well as political factors, played a large role in explaining state-to-state differences in food stamp caseload changes but changes in welfare policies had only a small influence on changes in food stamp caseloads. Ziliak et al. (2003) showed that the macroeconomy had a substantial effect on food stamp caseloads: a 1-percentage point increase in the unemployment rate led to a 2.3-percent increase in food stamp caseloads after 1 year. In terms of welfare policy, a 10-percentage-point increase in the share of a State's population waived from rules limiting food stamp receipt among able-bodied adults without dependents resulted in only a 0.5-percent increase in caseloads. Jacobson et al. (2001), using microsimulation to examine the reductions in food stamp caseloads and costs between December 1992 and

## Research Summary

FANRP research was instrumental in promoting understanding of how welfare reform affected Food Stamp Program operations, the well-being of participants, and eligible nonparticipants. Although food stamp caseloads dropped dramatically following welfare reform, several FANRP-funded studies attributed most of the decrease to the strong economy with PRWORA having a much smaller effect. Studies conducted in four States found that large percentages of ABAWDs who left the Food Stamp Program after welfare reform experienced economic difficulties including low incomes and high poverty rates. Among families who left the TANF program, those who were better off were less likely to participate in the Food Stamp Program. An unintended consequence of the welfare-to-work system of public assistance was to put downward pressure on wages for low-skill occupations.

December 1998, found that about one-third of the simulated reductions in caseloads and costs could be attributed to specific changes in State cash welfare and child care policies and about two-thirds could be attributed to changes in State unemployment rates (about half of the change could not be simulated). Gleason et al. (2001) found that specific policies central to the early welfare reform effort, such as work requirements and time limits for cash assistance, did not strongly influence the food stamp caseload. Restricted eligibility for food stamps for aliens and ABAWDs showed some negative impacts, but their influence was small in comparison with that of economic expansion.

### ***Welfare offices' practices discouraged some eligible families from participating in food stamps***

To look at how specific policies and practices of welfare reform might be affecting Food Stamp Program access, FANRP partnered with the U.S. Department of Health and Human Services in supporting a number of cases studies. A study by Quint and Widom (2001) of welfare offices in four urban areas found that welfare staff members did not routinely inform newly employed welfare recipients of their likely eligibility for continued food stamps. Furthermore, when recip-

ients failed to attend an eligibility redetermination appointment (which may be especially inconvenient for recipients who are working), both cash assistance and their food stamps were terminated without notice. These results suggests that many of the working recipients who failed to attend redetermination meetings were unaware of differences in TANF and food stamp eligibility rules and that they could receive food stamps.

### ***Effects on Individuals***

#### ***Food stamp leavers experience difficult transition to self-sufficiency***

Strong economic conditions along with welfare reform led to dramatic reductions in food stamp caseloads during the mid- to late 1990s. However, it was unclear if those leaving the program were making ends meet. To learn more about how those who leave the Food Stamp Program fare, FANRP funded four State studies (Arizona, Illinois, Iowa, and South Carolina) that examined the well-being of those who left the Food Stamp Program in the post-welfare era (Mills and Kornfeld, 2000; Rangarajan and Gleason, 2001; Jensen et al., 2002; and Richardson et al., 2003). A summary of the four studies that focused on ABAWDs concluded that although ABAWD leavers tended

to have high employment rates, earnings and incomes were low (Dagata, 2002). High poverty rates for ABAWD leavers' households underscored the difficulty that many in this group faced trying to make ends meet. For example, between 17 and 34 percent of the ABAWD leavers reported what is now referred to as very low food security, and about another 20 percent reported the less severe category of food insecurity. Large percentages of ABAWD leavers also reported facing additional economic difficulties including housing problems and problems paying for utilities.

### **Eligible nonparticipants are disproportionately better off than participants**

Another FANRP study examined who among those who left cash assistance do not participate in the Food Stamp Program when eligible to do so (Goerge et al., 2004). Results showed that the unmarried, those with long histories of TANF receipt, those with poor work histories, and African-Americans were more likely to participate in the Food Stamp Program after

leaving TANF. As had been noted in earlier studies, this indicates that among those eligible for food stamps, it is disproportionately those who are better off who choose not to participate. The study found significant variation in food stamp participation rates among district offices, suggesting considerable variation in the efficacy of implementing program objectives. This points to the importance of the district office in facilitating food stamp participation and disseminating information.

### **Spending on food stamp employment and training increased**

Welfare reform limited ABAWDs to 3 months of food stamps out of each 3-year period, except in those months that they are meeting work requirements. The Balanced Budget Act of 1997 more than doubled the funding available to States for the Food Stamp Employment and Training (E&T) Program and mandated that States spend at least 80 percent of the funding on services that help ABAWDs comply with work requirements. The Act also mandated that

USDA examine and report to Congress on how States use the new funds to create work opportunities for ABAWDs and whether this was done in an efficient and effective manner. The resulting Report to Congress showed that total E&T program spending increased, though States used less of their Federal grant allocations and more of State matching funds (Botsko et al., 2001). Most States also changed the focus of their E&T program services to target ABAWDs. Nationwide participation in the E&T program dropped sharply after the Balanced Budget Act, with variations among States and among E&T component types. The decline in E&T participation was attributed in part to the decline in total food stamp caseload, especially among ABAWDs, over the same period.

### **Other Studies**

#### **States re-engineered their Food Stamp Programs as a result of welfare reform**

Along with mandatory changes in food stamp eligibility, PRWORA gave States greater flexibility to administer their programs to meet their unique needs. While States had begun changing the way program services were delivered before passage of welfare reform legislation, PRWORA provided additional opportunities for them to "re-engineer" their Food Stamp Programs in their State to meet their unique needs. Bell et al. (2002) examined State-level administrative changes to the Food Stamp Programs as a result of PRWORA. All 49 States and the District of Columbia participating in the study undertook at least one "re-engineering" activity in their states' Food Stamp Programs, as a result of PRWORA. In addition, 35 States implemented changes in 3 or more re-engineering categories. A significant effort was focused on improving access to the Food Stamp



Ken Hammond, USDA



Ken Hammond, USDA

Program: 39 States implemented changes to improve program accessibility. Thirty-four States took steps to conform TANF and Food Stamp Program rules, and 24 States implemented increased program monitoring and evaluation. This FANRP study highlights how the flexibility created by PRWORA has significantly altered how the Food Stamp Program is administered across the country.

### ***Welfare reform affects urban and rural areas differently***

Compared with urban areas, rural areas have higher poverty rates, lower population densities, fewer job options, and greater distances to jobs. A FANRP report that provided the first comprehensive analysis of the spatial dimensions of PRWORA concluded that the overall effects of welfare reform on caseloads, employment, and poverty have been positive in both rural and urban areas (Whitener et al., 2002). Yet, several

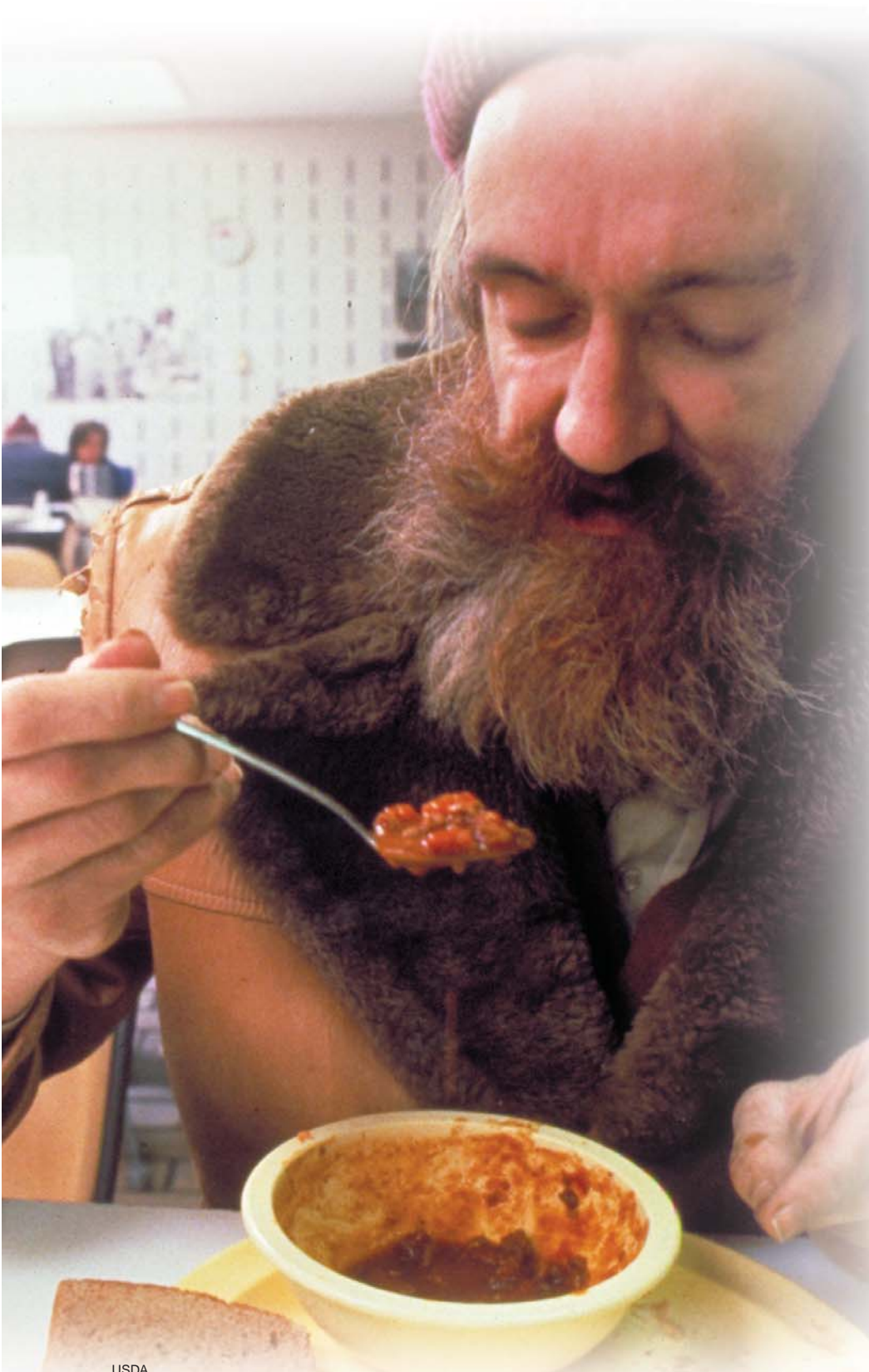
studies of individual State welfare programs and specific policy provisions have found smaller welfare reform effects on caseloads, employment, earnings, and poverty in rural areas than in urban areas. These differences in outcomes are due in part to variation in State welfare programs. State programs differ, for example, on the amounts and types of assets used to determine eligibility and benefits, the time period for work requirements, and the design of child care and transportation assistance programs. At the same time, rural areas are diverse and welfare recipients in some areas are harder to serve than in others. National-level analyses using a simple metro-nonmetro dichotomy can mask rural variation in welfare program operation, structure of opportunities at the local level, and program outcomes. Several studies show that State welfare programs and policy provisions have had less effect on employment and earnings in rural

areas than in urban areas. Residents of sparsely settled rural areas face unique challenges to working, including long distances to jobs and limited options for services, such as health and child care.

### ***Welfare-to-work provision increased labor supply but reduced wage growth***

Using a computer simulation model, Hanson and Hamrick (2004) examined some of the labor market impacts of the “welfare-to-work” provisions of the Personal Responsibility and Work Opportunity Reconciliation Act of 1996. From 1996 to 2000, the influx of public assistance recipients into the labor force resulted in an increase in the workforce of about 2.4 million persons. This influx accounted for 18 percent of the labor force growth during this time period and 1 percentage point of real gross domestic product (GDP) growth. The finding that the increase in labor supply from the movement of public assistance recipients into the workforce contributed to economic growth is an economic benefit from welfare reform. However, a “spillover effect,” or unintended consequence, of the welfare-to-work system of public assistance was to put downward pressure on wage growth for low-skill occupations. Wage growth was reduced by 2.5 percentage points to 4.4 percent, versus 6.9 percent that the authors estimated would have occurred without the influx of new workers.

# FOOD SECURITY



Food security—access by all people at all times to enough food for an active, healthy life—is one of several conditions necessary for a population to be healthy and well-nourished. Although America has one of the most abundant and affordable food supplies in the world, not everyone in this country is food secure.

## Research Highlights

### *Measuring Food Insecurity*

#### *FANRP sponsors the annual Food Security Supplement*

Since 1995, USDA has measured the prevalence and severity of household food insecurity based on data collected in the Food Security Supplement to the Current Population Survey (an annual nationally representative survey of about 50,000 households) and published the results in a series of annual reports on *Household Food Security in the United States*. Based on responses to a series of questions in the survey, households are classified into one of four broad levels of food security—high food security, marginal food security, low food security, and very low food security. The reports and underlying data are widely used by government agencies, the media, and advocacy groups to monitor the prevalence of food insecurity, identify those population groups at the greatest risk of food insecurity, assess the performance of USDA’s food and nutrition assistance

## Research Summary

FANRP is the national leader of measurement and research on domestic food security. FANRP sponsors the annual food security survey and publishes the annual report on *Household Food Security in the United States*. FANRP research has linked food insecurity to a number of adverse outcomes, including effects on the health status of young children, mental health of mothers, and nutritional status of the elderly. The prevalence of food security in a State depends not only on the characteristics of households in the State, such as their income, employment, and household structure, but also on State-level characteristics, such as average wages, cost of housing, levels of participation in food assistance programs, and tax policies. Evidence suggests that some food and nutrition assistance programs reduce the likelihood of food insecurity.

programs, and determine the impact of particular public policies and programs. In 1998, ERS assumed sponsorship of the survey from USDA's Food and Nutrition Service (FNS), and, along with FNS, analyzes the data and prepares the annual report.

### **FANRP commissions review of methodology for measuring food insecurity**

At about the 10-year anniversary of the Federal measurement of food security, FANRP commissioned the Committee on National Statistics (CNSTAT) of the National Research Council to provide a scientific review of the methodology for measuring households' food security and the language used to describe their food security status. CNSTAT concluded that the measurement of food insecurity and hunger is important and recommended that USDA continue to measure and monitor food insecurity regularly in a household survey (National Research Council, 2006). While affirming the appropriateness of the general methodology used to measure food insecurity, CNSTAT recommended that new methods be developed to measure hunger. They also recommended alternative labels to convey the severity of food insecurity without using the word "hunger." As a result, the labels "low food security," and "very low food security" replaced

the labels "food insecurity without hunger," and "food insecurity with hunger" that were used previously.

### **Prevalence and Persistence of Food Insecurity**

#### **11 percent of American households were food insecure at some time during 2005**

Data from the December 2005 food security survey indicate that 12.6 million U.S. households, or 11.0 percent of all households, were food insecure in 2005, meaning that at times, they were uncertain of having, or unable to acquire, enough food for all household members because they had insufficient money and other resources

for food (Nord et al., 2006) (fig. 8-1). About one-third of food-insecure households had very low food security, meaning that at times the food intake of some household members was reduced and their normal eating patterns were disrupted. The other two-thirds of food-insecure households obtained enough food to avoid substantial disruptions in eating patterns and food intake, using a variety of coping strategies, such as eating less varied diets, participating in Federal food assistance programs, or getting emergency food from community food pantries or emergency kitchens.

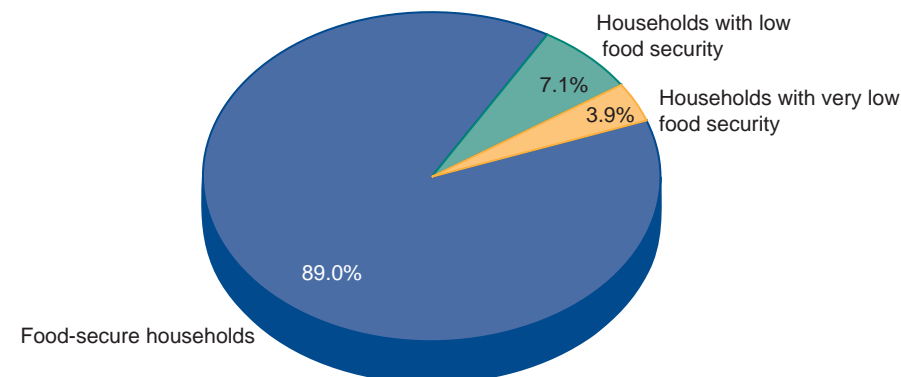
### **Food insecurity is linked to household characteristics**

Responses from the 2005 food security survey indicate that rates of food insecurity were substantially higher for households with incomes near or below the Federal poverty line (36.0 percent), households headed by single women with children (30.8 percent), and for Black (22.4 percent) and Hispanic (17.9 percent) households (Nord et al., 2006). Households with children reported food insecurity at about double the rate for households without children (15.6 vs. 8.5 percent).

Figure 8-1

### **U.S. households by food security status, 2005**

11 percent of all U.S. households were food insecure



Source: Nord et al., 2006.



USDA

### ***Food-insecure households are likely to use food assistance***

More than half (56 percent) of food-insecure households received assistance from at least one of the three largest Federal food assistance programs during the month prior to the December 2005 food security survey (Nord et al., 2006). The largest share of food-insecure households was reached by the Food Stamp Program (36 percent), followed by National School Lunch Program (33 percent), and WIC (13 percent). About 22 percent of all food insecure households obtained food from food pantries at least once during the previous 12 months.

### ***Persistence of food problems is low for most households***

Ribar and Hamrick (2003) examined the dynamics of food insufficiency—a condition closely related to very low food security. A household was considered food insufficient if household members either sometimes or often do not have enough to eat. The study found that the incidence of food insufficiency in the United States was low, less than 3 percent of the population lived in food-insufficient households in 1997. Persistence in food insufficiency was low as well: 79 percent of the people living in food insufficient households in 1994-95 were in food sufficient households 2 years later. The findings support the design of the food assistance programs as a safety net for low-income people, particularly those with unexpected income difficulties. However, for persistently food-insufficient households, more targeted assistance may be necessary.

### ***Persistence in food insecurity among families with children is high***

Hofferth (2004) examined the prevalence of and changes in food security between 1997 and 1999 among individual families with children younger than 13 years old. Results from the study indicate that families with the youngest child under age 3 were more likely to be food insecure than families with children age 10-13. Although food insecurity was low over the 2-year period (about 10 percent of the families were food insecure each year), persistence in food insecurity among families with children was high: about half of the families that were food insecure in 1997 were still food insecure in 1999.

### ***Outcomes Associated With Food Insecurity***

FANRP has funded a wide body of research that has linked food insecurity to a number of adverse outcomes for persons of different ages.

#### ***Food insecurity is associated with adverse health outcomes among infants and toddlers***

Cook et al. (2004) examined the relationship between food insecurity and adverse health outcomes in a study of high-risk, low-income children age 36 months or younger. Results indicate that infants' and toddlers' exposure to food insecurity was associated with greater odds of fair/poor health status (versus excellent/good) and of experiencing health problems requiring hospitalization as reported by the child's caregiver. Participation in the Food Stamp Program weakened (but did not eliminate) the association between food insecurity and fair/poor health.

### ***Child food insecurity linked to Iron Deficiency Anemia***

In the first published study examining the relationship between child food insecurity and iron deficiency anemia, Skalicky et al. (2006) found that food-insecure children 6 months to 3 years of age were significantly more likely to have iron deficiency with anemia than food-secure children. Iron deficiency anemia is a known risk factor for negative cognitive and behavioral outcomes.

### ***Mental health problems in mothers and children are more common in food insecure households***

Based on a survey of urban mothers of 3-year-old children, Whitaker et al. (2006) found that the percentage of children with a behavior problem increased with increasing food insecurity. The percentage of mothers experiencing either major depressive episodes or generalized anxiety disorders also increased with increasing food insecurity. Similarly, Laraia et al. (2006) found that food insecurity was linked to depression among pregnant women.

### ***Elderly food-insecure people have poorer dietary intake, nutritional status, and health status than food-secure elderly people***

Lee and Frongillo (2001) examined the nutritional and health consequences associated with food insecurity among the elderly. Results indicated that food-insecure elderly people had significantly lower intakes of a number of nutrients, had lower skin-fold thickness, and were more likely to self-report poorer health status than food-secure elderly people.

### ***Predictors of Food Insecurity***

FANRP studies have also examined factors that predict food insecurity.



**Prevalence of food security depends on State-level characteristics as well as household characteristics**

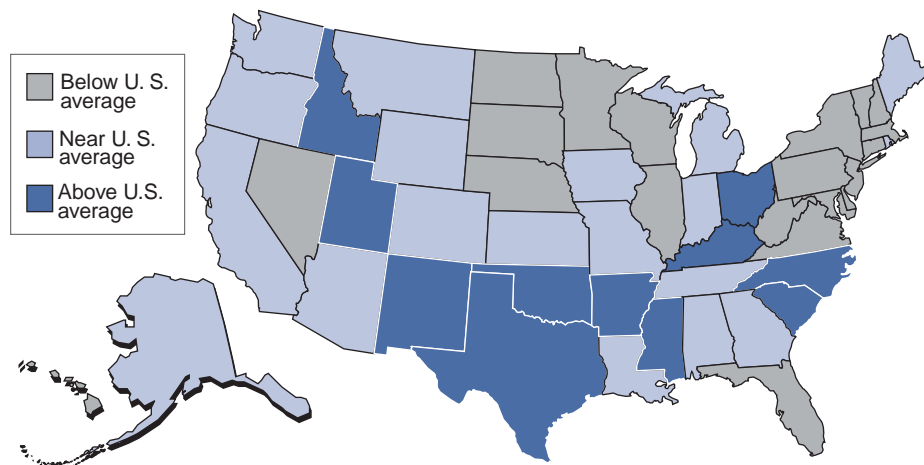
During the 3-year period 2003-05, the prevalence of food insecurity varied from over 16 percent in New Mexico and Mississippi, to less than 7 percent in North Dakota, New Hampshire, and Delaware (Bartfeld et al., 2006) (fig. 8-2). The prevalence of food security in a State depends not only on the characteristics of households in the State, such as their income, employment, and household structure, but also on State-level characteristics, such as average wages, cost of housing, levels of participation in food assistance programs, and tax policies. Taken together, an identified set of household-level and State-level factors accounted for most of the State-to-State differences in food security. Some State-level factors point to specific policies that are likely to improve food security, such as policies that increase the supply of affordable housing, promote the use of Federal food assistance programs, or reduce the total tax burden on low-income households.

**Poor households make tradeoffs between food spending and heating and cooling costs**

Nord and Kantor (2006) examined the association between household food insecurity and seasonally high heating and cooling costs. Low-income households, especially those consisting entirely of elderly people, were more likely to experience very low food security during times of the year when home heating and cooling costs were high. In high-cooling States, the chances of very low food security for poor, elderly-only households were 27 percent higher in the summer than in the winter. In high-heating States, the chances of very low food security were 43 percent lower in the summer. The results suggest that for many

Figure 8-2

**Prevalence of food insecurity, average 2003-05**



Note: The prevalence of food insecurity in the United States averaged 11.4 percent during this period.

Source: Nord et al., 2006.

poor households, the tradeoffs between food spending and seasonally high heating and cooling costs are not easily made without human cost or within a zone of comfort.

**Relationship Between Food and Nutrition Assistance and Food Insecurity**

USDA’s food and nutrition assistance programs are the centerpiece of the Federal effort to fight hunger in this country. A number of FANRP studies have examined the role of the programs in reducing and preventing food insecurity.

**Welfare programs improve food security**

One FANRP-funded study looked at the issue of whether public assistance programs (including food stamps, Medicaid, and cash benefits) reduce the probability that vulnerable households experience food insecurity. Borjas (2004) took advantage of a “natural experiment” when Federal welfare reform legislation limited the eligibility of immigrant households to receive assistance, while some States

chose to continue offering State-funded assistance to immigrant households. The study exploited these changes in eligibility rules to examine the link between food insecurity and public assistance. Results indicate that a 10-percent cut in the share of the immigrant population that receives public assistance increased the share of immigrant food-insecure households by about 5 percentage points. While providing evidence that welfare programs improve food security, the study also suggests that while tightening welfare eligibility rules can reduce welfare costs, such action can have adverse outcomes.

**School Lunch and Summer Food Service Programs improve food security for households with children**

A study by Nord and Romig (2006) found that among low-income households, the seasonal difference in the prevalence of food insecurity was substantially greater in households with school-age children. That is, there was a higher prevalence of food insecurity in the summer than in April, and the pattern was stronger for households with school-age chil-

dren than for other households. Furthermore, among the households with school-age children, the seasonal difference in food insecurity was substantially smaller in States that provided a large number of free and reduced-price lunches through the National School Lunch Program and Summer Food Service Program in the summer relative to the number of free and reduced-price lunches through the National School Lunch Program during the school year.

**The National School Lunch Program helps households escape severe food insecurity**

For households that experienced very low food security (referred to in the report as food insecurity with hunger) during the course of a year, Kabbani and Kmeid (2005) examined whether food and nutrition assistance use was associated with lower likelihood of food insecurity during the last 30 days of that year. They found that participation in the National School Lunch Program was associated with lower likelihood of food insecurity for households with school-age children. This association appeared to be strongest for households that were eligible for free meals. Results of the study also suggest that higher Food

Stamp Program benefit amounts are strongly associated with lower likelihood of food insecurity for households that experienced very low food insecurity during the year.

**Selection bias hinders attempts to measure impact of food stamps on food insufficiency**

Food stamp recipients typically have higher rates of food insufficiency than eligible nonparticipants—a counterintuitive result given that the Food Stamp Program’s primary goal is to provide a safety net against hunger. Adverse selection, whereby households who are more likely to be food insufficient are also more likely to enter into the Food Stamp Program, confounds the relationship between food stamps and food insufficiency. After employing statistical models that attempt to control for this selection bias, Gundersen and Oliveira (2001) found that food stamp participants had the same probability of food insufficiency as nonrecipients.

**Three-quarters of households utilizing the emergency food assistance system are food insecure**

FANRP sponsored the first comprehensive government study of the Emergency Food Assistance System

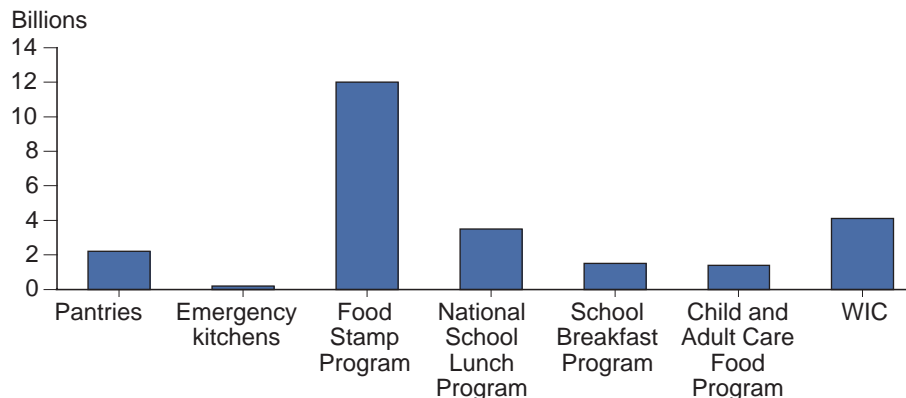


(EFAS). In addition to the Federal food and nutrition assistance programs, many needy households utilize private, nonprofit, charitable organizations that provide emergency food at the local level. The study provided nationally representative information about EFAS operations, the five major types of organizations involved in EFAS (emergency kitchens or “soup kitchens,” food pantries, food banks, food rescue organizations, and emergency food organizations), and how EFAS fits within the context of USDA’s food and nutrition assistance programs (Ohls et al., 2002). Among its findings, the study found that, during a typical month in 2001, food pantries served about 12.5 million people, and emergency kitchens served about 1.1 million people. About three-fourths of EFAS households were food insecure. The majority of EFAS households participated in a Federal food and nutrition assistance program—including two-thirds of food-pantry clients—suggesting that their use of a food pantry or emergency kitchen supplements, not replaces, Federal food and nutrition assistance. The EFAS system was small relative to the Federal food and nutrition assistance programs (fig. 8-3). On a per-month basis, food pantries and emergency kitchens provided an estimated 198 million meals in 2000 compared with almost 1.9 billion meals provided through the five largest USDA food and nutrition assistance programs. USDA commodities accounted for nearly 14 percent of all food distributed by the EFAS.

Figure 8-3

**Meal equivalents served per year by selected programs**

*USDA is the primary source of food assistance for low-income households*



Source: Ohls et al., 2002.

# CHILDHOOD OBESITY



The prevalence of overweight and obesity among children has tripled in the last three decades. Overweight children are more likely to experience health problems during their youth. Furthermore, overweight children tend to become obese adults and obesity in adulthood is a known risk factor for a number of chronic diseases, including heart disease, diabetes, stroke, and some forms of cancer. Due to the difficulty of achieving long-term weight loss, the prevention of obesity is critical. The increase in the prevalence of overweight among children suggests that prevention efforts need to begin at an early age. Understanding the causes of childhood obesity is crucial to the development of effective prevention and treatment strategies.

## Research Highlights

### *Prevalence and Depth of Childhood Overweight*

#### *Prevalence of overweight among school-age children differs by income*

Lin (2005) grouped school-age children, age 5-18, into three income classes: the lowest income (family income not exceeding 130 percent poverty level), low income (131-185 percent poverty), and higher income (above 185 percent). These income cutoffs correspond to income eligibility thresholds to participate in the Food Stamp Program, WIC, and free and reduced-price school

## Research Summary

FANRP has pioneered research to increase our understanding of the factors associated with childhood obesity and the role of the food and nutrition assistance programs. Measures of the prevalence of overweight among children may understate the extent of this public health problem. Not only have more children become overweight in the last three decades, but overweight children have been getting heavier. A number of FANRP studies have examined factors associated with childhood obesity, especially those within parents' control, such as breastfeeding, time spent with the child, eating meals as a family, and television watching. Findings from these studies highlight the importance of pregnancy and childhood as critical stages to intervene in obesity prevention. Other studies have highlighted the linkages between obesity and the consumption and prices of certain types of food and beverages. Studies have found no evidence that participation in food assistance programs increases the likelihood of childhood obesity.

meals. After adjusting for age, children in the lowest income group were more likely to be overweight than children in the low- and higher income groups (fig. 9-1). There were notable differences by gender. The only difference among boys is observed between the lowest income and higher income groups, whereas girls in the lowest income group were almost twice as likely as girls in the low-income group to be overweight.

### **Prevalence of childhood obesity among preschoolers differs by race/ethnicity**

A study of preschool children in 20 large U.S. cities by Whitaker and Orzol (2006) found a disparity in children's obesity rates by race/ethnicity that appears early in life. The prevalence of obesity at age 3 was found to be significantly higher in Hispanics (the largest minority group in the United States) than in either whites or blacks, but prevalence did not differ significantly between whites and blacks. The elevated risk for obesity in Hispanic children was not explained by racial/ethnic differences in household income, maternal education, and children's food security, suggesting that other unidentified factors are responsible.

### **Severity of childhood obesity is increasing**

Measures of the prevalence of overweight among children may understate the extent of this public health problem. A study of children from 1971 to 2001 found that not only have more children become overweight in the last three decades, but overweight children have been getting heavier (Jolliffe, 2004). In fact, the severity of child overweight has been increasing faster than the prevalence of child overweight regardless of age, sex,

race, and ethnicity. These findings could have important health implications since it is likely that very overweight children, like adults, are more likely to suffer health problems than the less overweight.

### **The Role of Parents**

FANRP has sponsored a number of studies that examine the important role that parents play in childhood obesity.

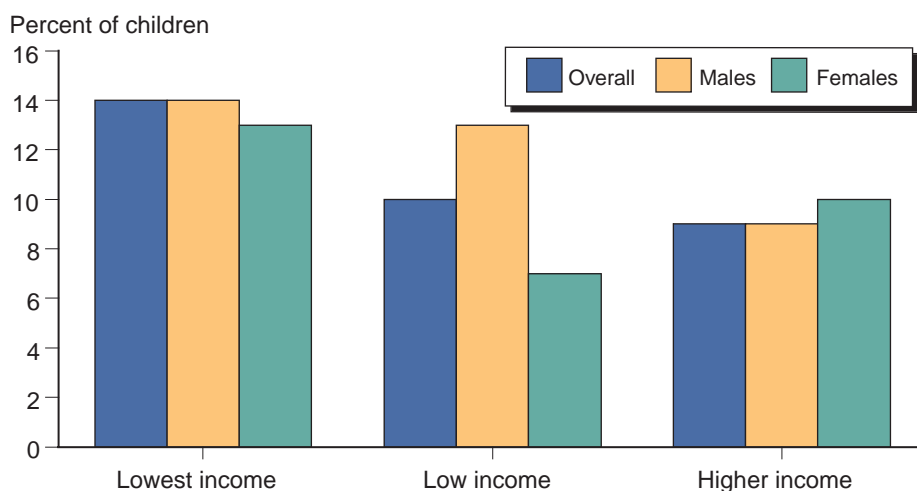
### **Maternal obesity increases child's risk of obesity**

In a study of children participating in the Ohio WIC program, Whitaker (2004) found that obesity during the preschool years was strongly associated with the mother's Body Mass Index (BMI) in early pregnancy. By 4 years of age, obesity was present in almost 1 in 4 of the children who were born to obese mothers compared with less than 1 in 10 of children who were born to normal-weight mothers (fig. 9-2). Even after controlling for birth weight, newborns whose mothers were obese in early pregnancy were more than twice as likely to be obese

Figure 9-1

### **Prevalence of overweight among school-age children, age adjusted**

*Lowest income children are more likely to be overweight*



Source: Lin, 2005.

preschoolers. Identifying those infants at birth who are at high risk of developing childhood obesity provides an important opportunity to begin early intervention and prevention efforts before the onset of the disease.

**Breastfeeding protects children against later obesity only when breastfeeding is sustained**

In one of the largest studies to examine the link between breastfeeding and obesity among low-income children, Bogen et al. (2004) found that the effect of breastfeeding depended on four factors—duration of breastfeeding, concurrent formula feeding, child’s race, and mother’s smoking during pregnancy. Breastfeeding was associated with a reduced risk of obesity at age 4 among the children of white women who did not smoke during pregnancy. Even in this subgroup of children, breastfeeding was associated with a reduced risk of obesity only when breastfeeding continued for at least 16 weeks without concurrent formula or at least 26 weeks with formula. The protection was stronger when breastfeeding occurred without bottle feeding of infant formula.

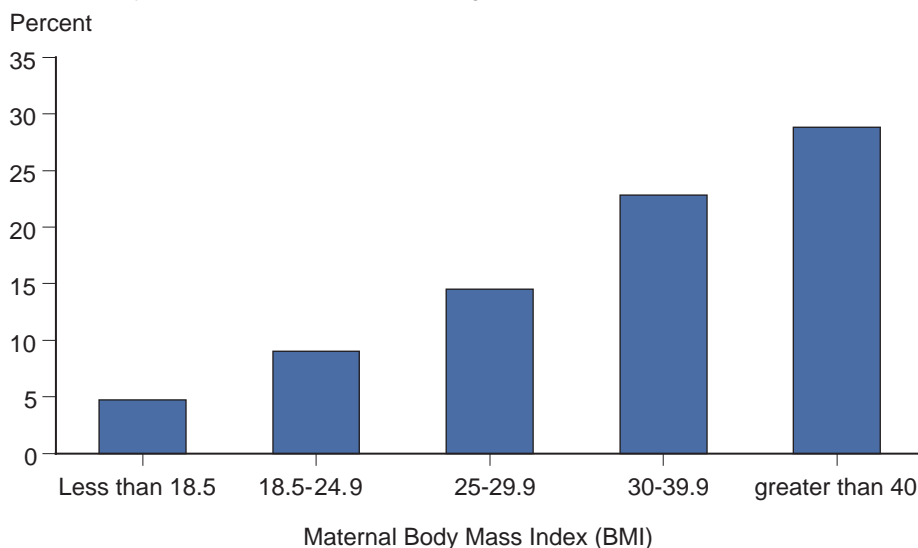
**Parental nutrition knowledge is associated with lower prevalence of overweight children**

Variyam (2001) examined the association between nutrition knowledge and attitudes of parents and the prevalence of overweight among their children. He found that greater parental nutrition knowledge and use of nutrition labels were associated with lower prevalence of overweight children—a result that provides support for the role of national nutrition education programs. Compared with parents who failed to recognize their own overweight status, parents who correctly perceived themselves as being overweight were less likely to

Figure 9-2

**Percentage of obese 4-year-old WIC children by maternal BMI**

*Child obesity rates increased with increasing mother's BMI*



Source: Whitaker, 2004.



have children who were overweight (fig. 9-3). This finding suggests that a parent’s readiness to make changes in their child’s diet and activity may be related to their perception of their own weight status.

**Parents’ time with children affects obesity outcomes**

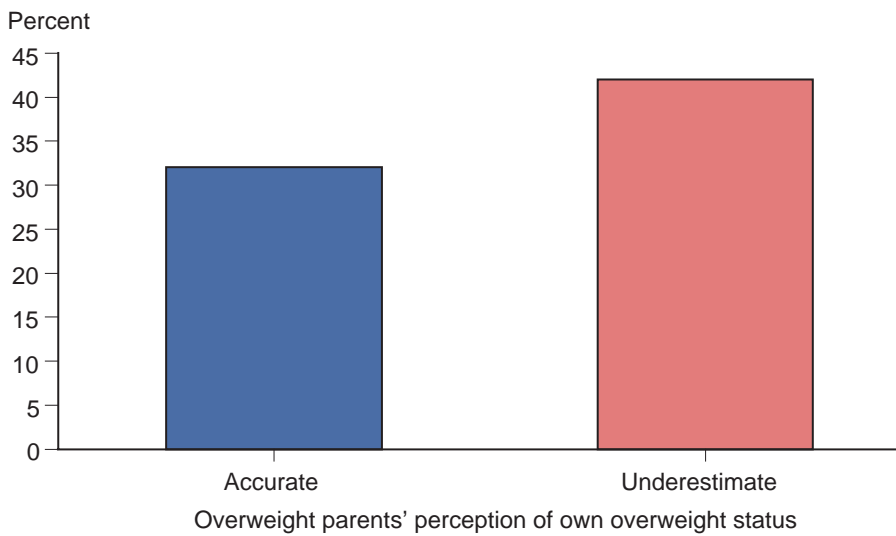
McIntosh et al. (2006) found that the amount of time parents spent with children significantly affected children’s energy and fat intake and obesity-related outcomes. Mothers’

and fathers’ time spent with their children had different impacts. For example, the more time mothers spent with their children, the lower the children’s BMI, while the more time fathers spent with their children, the higher the children’s BMI. And, the more time both fathers and mothers spent with their children, the higher was their children’s fat intake (as a percentage of energy). In general, mothers tended to have a greater effect on their children’s dietary intake than fathers did. And, as might be expected, both mothers’ and

Figure 9-3

**Percent of children overweight by parental perception of own overweight status**

*Children of parents who underestimate their own overweight status have a greater likelihood of being overweight*



Source: Variyam, 2001.

fathers' impacts on their children's nutrient intakes and outcomes declined with the age of the child.

**Television watching and frequency of family meals are predictive of overweight onset and persistence**

Gable et al. (2007) found that children who ate fewer meals with their families and watched more television during kindergarten and first grade were more likely to be overweight in the third grade. Similarly, children who ate fewer meals with their families and watched more television from kindergarten through the third grade, and who lived in neighborhoods perceived by parents as less safe for outdoor play were more likely to be persistently overweight.

**Food Consumption and Food Prices**

Several FANRP studies have highlighted the linkages between obesity and the consumption and prices of certain types of food and beverages.

**Children's food choices are associated with overweight**

A study of school-age children found that consumption of low-fat milk, other dairy products, fruits, and legumes was negatively associated with the probabilities of being at risk for overweight and obesity (Boumtje et al., 2005). In contrast, results suggested that increasing consumption of soft drinks, fat, oils, and sodium are the major dietary factors positively associated with childhood overweight.

**Fruit and vegetable prices are associated with changes in elementary schoolchildren's BMI**

Sturm and Datar (2005) found that children who lived in metropolitan areas

where fruits and vegetables were relatively expensive experienced significantly greater increase in BMI than children—matched for otherwise-similar characteristics and standard of living—who lived where fruits and vegetables were cheaper. On the other hand, they found no significant relationship between children's excess weight gain and dairy or fast-food prices. Food outlet density at the neighborhood level was also insignificant, possibly because availability is not an issue in metropolitan areas.

**Consequences of Overweight**

**Change in overweight status is associated with adverse school outcomes**

Datar and Sturm (2006) conducted one of the first studies to examine the link between change in overweight status and elementary school outcomes. Among girls, moving from not-overweight to overweight between kindergarten entry and end of third grade was associated with reductions for math and reading standardized test scores, teacher ratings of social-behavioral outcomes, and approaches to learning. However, the link between change in overweight status and adverse school outcomes was mostly absent among boys. Even though a significant association was found between increase in Body Mass Index and worse school outcomes among girls, the magnitude of this association was smaller than that of family characteristics such as mother's education and family income.

**Relationship of Food Assistance and Nutrition Programs to Obesity**

The major food assistance and nutrition programs were established when hunger and nutrient deficiencies were the Nation's principal nutritional concerns. However, as the major nutrition problems facing the U.S.

population have shifted from under- to overconsumption, some have questioned whether food and nutrition assistance programs contribute to obesity by providing too much food and encouraging participants to either eat too much or eat the wrong types of food. This is an especially important question since a large percentage of the Nation's children participate in at least one of USDA's food assistance programs.

***No evidence that participation in food and nutrition assistance programs contributes to overweight among children***

A study by Hofferth and Curtin (2005) examined the extent to which three of the food assistance programs contributed to childhood overweight. The study found that participation in the Food Stamp Program was not associated with an increased chance of childhood overweight. Furthermore, within food stamp families, children in families receiving more food stamp benefits were neither more nor less likely than children in families who receive less benefits to be overweight. There was also no evidence that

participation in the National School Lunch Program or the School Breakfast Program contributed to overweight among children.

***Children's participation in WIC does not lead to increased caloric consumption***

Oliveira and Chandran (2005) examined the consumption patterns of WIC children and three different comparison groups: eligible nonparticipating children living in non-WIC households, eligible nonparticipating children living in WIC households, and children living in households whose income was too high to be eligible for WIC. Participation in WIC was associated with a significant increase in calories consumed from all WIC-allowed foods combined (i.e., low-sugar cereal, 100-percent fruit and/or vegetable juice, eggs, milk, cheese, peanut butter, and dried peas/beans). However, WIC participants consumed significantly fewer calories from non-WIC foods than the two groups of eligible nonparticipants. Although WIC participants consumed more total calories than children not eligible

to participate because their household income was too high, there was no evidence that participation in WIC contributes to increased caloric consumption among children eligible to participate. The results suggest that WIC foods replace non-WIC foods in the diets of children participating in WIC rather than add to their food consumption.

***Children consume more soft drinks and less milk on weekends***

Research by Yen and Lin (2002) suggest that the displacement of milk by soft drinks as a child becomes older is a factor that contributes to children being overweight. On average, for each 1-ounce reduction in milk consumption, a child consumes 4.2 ounces of soft drinks, resulting in a net gain of 31 calories per ounce of milk displaced. The study also found that children consume more soft drinks and less milk during weekends than weekdays—a result that may be due in part to children drinking milk provided through the National School Lunch Program on weekdays.



Paul J. Richards, AFP/GettyImages

# DIETARY REFERENCE STANDARDS AND NUTRITION MONITORING

Dietary and nutritional reference standards are used in assessing and monitoring the diets and health of individuals. Food assistance programs use dietary reference standards to establish program goals and objectives and to evaluate program effectiveness.

## Research Highlights

*New dietary reference standards make it possible to assess nutrient adequacy*

In the past, Recommended Dietary Allowances (RDAs) were the benchmark measures used for assessing nutrient intake. However, with advances in the scientific knowledge regarding the roles of nutrients in human health, the Institute of Medicine (IOM) developed a new set of dietary reference standards—Dietary Reference Intakes (DRIs)—to replace and expand the RDAs. Because adoption of DRIs represents a major shift from the use of RDAs, the IOM established a subcommittee to focus specifically on the application of the new DRIs. FANRP provided funding to the subcommittee that resulted in two reports: one providing scientific guidance on the application of the DRIs in dietary assessment with a new methodology that allows estimating the percentage of a group with adequate intake for specific nutrients (Institute of Medicine, 2000); the other providing guidance on the use of DRIs in planning diets for individuals and groups (Institute of Medicine, 2003).



Dietary Guidelines  
for Americans



## Assessing the nutrient intakes of vulnerable subgroups

Studies of nutrient intake conducted prior to the development of the new DRIs used inappropriate methods to assess nutrient adequacy. A study by Devaney et al. (2005) used the new DRIs to assess the nutrient adequacy of segments of the population at risk of inadequate nutrient intake, excessive intake, or dietary imbalances. The vulnerable population subgroups of interest included adolescent females, older adults, children and adults at risk of overweight, individuals living in food-insufficient households, low-income individuals, and individuals targeted by and participating in food and nutrition assistance programs. The study indicated: generally inadequate intakes of key micronutrients, especially magnesium, calcium, folate, and vitamin E, as well as of fiber; caloric intakes less than recommended caloric requirements for adults; and consumption of too many calories from fat and not enough from carbohydrates. Surprisingly, the study also found caloric intake less than recommended caloric requirements for adults, although a later study, described below, explored possible explanations for the apparent inconsistency with data on the ongoing rise in obesity. The study adds to a growing literature that uses current, improved knowledge of nutrient requirements and the new dietary assessment methods recommended by the IOM to analyze nutrient intakes.

### **Errors in dietary recall data may partially explain the inadequacies and excessive intakes of some nutrients**

First-generation studies using the new DRIs raised questions as to whether the findings of dramatic dietary deficiencies among some population subgroups indicate true dietary problems, limitations of dietary assessment methods, or shortcomings with the

## Research Summary

FANRP research has contributed to improved analytic methods for assessing and monitoring the diets and health of program participants as well as non-participants. For example, FANRP studies provided guidance on appropriate methods for using the new Dietary Reference Intakes (DRIs), which replaced the old Recommended Dietary Allowances (RDAs). Other studies have used the new DRIs to assess the nutrient adequacy as well as the nutritional and health characteristics of segments of the population. This information is critical in identifying current and potentially important dietary problems that can be addressed by food policy, in establishing a baseline that can be used for monitoring over time, and for examining the impact of food assistance programs. FANRP also contributed to the development of the new international child growth standards for infants and young children and played a role in the 2005 Dietary Guidelines recommendations.

DRIs for some nutrients. It is important to understand which interpretation is most valid. Devaney et al. (2007) reviewed the studies and methods used to set the DRIs for selected nutrients and subgroups—food energy, zinc, preformed vitamin A for infants and young children, and magnesium, vitamin E, fiber, and potassium for older children and adults—to identify and document the factors that explain the study results. They concluded that although errors in dietary recall data—either overreporting of intakes for infants and young children, or underreporting of food intake and lack of data on nutrient supplements for older children and adults—may explain some of the inadequacies and excessive intakes, they are unlikely to explain away the problems (except, perhaps for excessive energy intake among infants and young children). They also cautioned that difficulties in collecting reliable data on the amounts and types of fats and oils consumed, and highly variable and imputed data on vitamin E values in nutrient databases, suggest that vitamin E intake may be underestimated. Data limitations and the resulting extrapolations used to set the DRIs raise several research questions regarding the derivation of the DRIs in question.

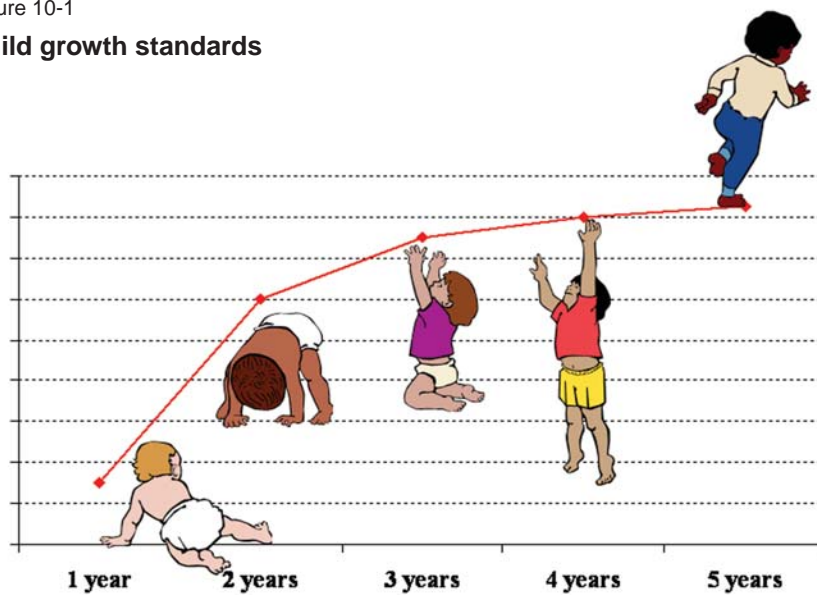
### **Baseline from which to monitor the nutritional and health characteristics of low-income populations is established**

FANRP funded a study that examined the nutritional characteristics and health status of four population subgroups—Food Stamp Program participants (Fox and Cole, 2004a); WIC participants (Cole and Fox, 2004b); school-age children (Fox and Cole, 2004b); and older Americans age 60 years and older (Cole and Fox, 2004a). The study establishes a baseline from which to monitor the nutritional and health characteristics of Americans, focusing on the low-



Figure 10-1

## Child growth standards



Source: World Health Organization, <http://www.who.int/childgrowth/en/>.

income population, over time and to generate questions for future research. A broad array of measures were examined, including dietary intake, body weight, bone density, health-related behavior, health status, and access to health care services.

### ***The 2005 Dietary Guidelines restore recommendation to consume a variety of nutrient-dense foods and beverages***

Between 1980 and 1995, all versions of the *Dietary Guidelines for Americans* included a recommendation to consume a variety of foods. However, concerns that advice to eat a variety of foods might lead to overconsumption resulted in the removal of the variety guideline in the 2000 Dietary Guidelines. A study by Foote et al. (2004),

one of the first to examine the effect of dietary variety on nutrient adequacy using the new DRIs, showed that consuming a variety of foods contributed to nutrient adequacy even though dietary variety was also associated with higher caloric intake. Based in part on this study, the 2005 Dietary Guidelines included a recommendation to consume a variety of nutrient-dense foods and beverages while meeting recommended intakes within caloric needs.

### ***New growth standards for infants and young children developed***

FANRP funded the U.S. data collection component for the new international Child Growth Standards for infants and young children up to age 5, developed by the World Health Organization (WHO) (see World Health Organization, 2006 for information on the methods and development of the new growth standards) (fig. 10-1). Current growth standards are based on a representative sample of the population and, therefore, reflect how children are currently growing, rather than how they should optimally grow. The new standards are based on breastfed children and, therefore, bring coherence between the tools used to assess growth and the national and international feeding guidelines, which recommend breastfeeding as the optimal source of nutrition during infancy. The new growth standards, which, for the first time, include standards for Body Mass Index (BMI) and six key motor development milestones, will allow improved assessment, measurement, and evaluation of breastfeeding and complementary feeding.

# DATA DEVELOPMENT

Food and nutrition assistance research rests on the availability and quality of data. Investments in data sources and data collection instruments provide a critical foundation for addressing new and emerging food and nutrition assistance issues in a timely and scientifically credible manner.

## Data Development Highlights

### *Enhanced Data Collection*

A major barrier to evaluation of the food and nutrition assistance and nutrition programs is the difficulty and cost of collecting nationally representative data on program participation and associated outcomes. FANRP has addressed this issue by using cost-sharing partnerships with other government agencies to add a food and nutrition assistance dimension to a number of existing, large national surveys, including:

- *Current Population Survey Food Security Supplement (CPS-FSS)*  
The Current Population Survey (CPS) is a monthly survey administered by the U.S. Census Bureau that obtains information from approximately 50,000 households. Once each year, the households participating in the CPS are asked a series of questions (the Food Security Supplement) about

## Data Development Summary

FANRP has made it a priority to develop nationally representative data on USDA's major food and nutrition assistance programs and to improve data collection instruments and methodology. FANRP has leveraged a number of national surveys by supporting the addition of food assistance modules to these surveys. The data collected from these modules help increase understanding of issues related to food security, the relationship between food and nutrition assistance program participation and childhood cognitive and physical development (including obesity), and the nutritional status and diet of food assistance program participants. FANRP has also developed data collection instruments and methodologies to improve research and evaluations. FANRP projects have also pioneered the feasibility of linking administrative data to estimate multiple food and nutrition assistance and nutrition program participation, and evaluated various data sources for their potential for analyzing the impact of USDA's food and nutrition assistance programs on nutrition- and health-related outcomes, including those that focus on American Indians.

food security, food expenditures, and use of food and nutrition assistance programs. The supplement is the basis of national and State estimates of food security at the household level.

- *National Health and Nutrition Examination Survey (NHANES)*  
Conducted by the Centers for Disease Control and Prevention, NHANES assesses the health and nutritional status of the population and monitors changes over time. Data from NHANES provide information about the nutritional status and diets of food assistance participants.
- *Early Childhood Longitudinal Study (ECLS)*  
The ECLS is conducted by the U.S. Department of Education and is comprised of two cohorts; one follows a sample of approximately 22,000 children from kindergarten through fifth grade (ECLS-K) and the other one follows a sample of approximately 11,000 children from infancy through first grade (ECLS-B). The surveys collect information on the children's cognitive, social, emotional, and physical development and home and school environment. FANRP funded the addition of questions

on participation in various food assistance programs, household food security status, as well as measured height and weight. Data from the ECLS can be used to examine the relationship between food assistance participation and children's cognitive and physical development (including obesity).

### **Development of Data Collection Instruments and Methodologies**

FANRP has supported the development of new and improved data collection instruments and methodologies to examine food assistance and nutrition-related issues.

### **FANRP is working to improve evaluations of FSNE**

USDA promotes healthful diets among program participants through its support for Food Stamp Nutrition Education (FSNE) which is aimed at improving the food choices of program participants. State Food Stamp Program agencies have the option to provide FSNE, with USDA reimbursing States 50 percent of allowable costs. The last decade has seen a dramatic expansion in FSNE, accompanied by increased interest in improving FSNE evaluation. As part

of a larger FANRP effort to develop a short questionnaire to assess the dietary behavior impact of FSNE, Hartline-Grafton et al. (2004) provided a compendium of 128 survey questions used in previous research to assess dietary knowledge, attitudes, and behaviors for low-income populations over the age of 18. The short questions or sets of questions on nine topics, (fruits/vegetables, grains/legumes/fiber, variety, fat, calcium, nonalcoholic beverages, knowledge, attitudes, and behaviors) are drawn from an extensive inventory and evaluation of available questions reported in the research literature.

### **Retail scanner data provide new insights to WIC nutrition education**

Nutrition education is a core component of the WIC program, along with the food packages and health care referrals. Federal regulations require that the WIC program offer at least two nutrition education contacts to the participant during each certification period. However, the effect of nutrition education on participants' food consumption behavior is difficult to ascertain. Bell and Gleason (2007) found that combining point-of-purchase grocery store data (i.e., store scanner data) with State WIC data is a feasible method to assess behavioral changes in WIC participants. The major obstacle is the recruitment of enough stores to allow for a representative sample of WIC participants to be included.

### **Module of eating habit questions was developed for inclusion in the ECLS-B**

FANRP funded a study by ORC Macro (2005) to obtain a better understanding of the design considerations with respect to interview wording and format, for a series of questions to be asked of mothers of children in kindergarten and/or first grade

(Grades K-1), regarding their child's food consumption habits. The questions were proposed for inclusion in the ECLS-B. The study found that most mothers were able to answer questions on their child's eating habits by using a variety of recall strategies or by using references. Most mothers used recall strategies, such as the recall of preferences and special events or a child's specific likes or dislikes. They also used references, such as the presence of a menu or snacking policies at school. Mothers did not generally struggle with terminology, but some words and concepts required clarification. Based directly on the results of this study, the module of questions was incorporated into the ECLS-B.

#### ***FANRP explores feasibility of linking administrative data to estimate multiple program participation***

Policy makers and researchers often want information about participation in multiple programs and the characteristics of families who choose to participate in some, but not all, programs for which they are eligible. Program participation is notoriously under-reported in national surveys, and currently administrative data are not combined across programs to allow USDA to calculate accurate and ongoing statistics on multiple-program participation. Cole (2003) investigated the feasibility of linking administrative data across programs to provide statistics on multiple-

program participation within the food assistance and nutrition programs. Results of the study indicate that Food Stamp Program and WIC statewide information systems vary significantly in the number and types of client identifiers, extent of data verification, and rules for data retention and overwriting. Despite that, record linkage is feasible in a number of States. The study found that participant data from the child nutrition programs are much more difficult to work with because they are typically unavailable at the State level and thus must be acquired at local levels.

#### ***Encouraging the Use of Publicly Available National Surveys***

FANRP encourages research that makes appropriate use of existing nationally representative surveys.

#### ***Food and nutrition assistance program data sources are evaluated***

FANRP sponsored a comprehensive review and evaluation of national data sources for their potential for analyzing the impact of USDA's food assistance and nutrition programs on nutrition- and health-related outcomes. The resulting report provided an inventory of data sources (mostly national level) that can be used as a foundation for future food assistance-related research (Logan et al., 2002). The report assessed data sources and identifies those most worthy of future investigation. Each data source was evaluated against three criteria:

- 1) coverage of both program participants and eligible nonparticipants for at least one of the food assistance and nutrition programs
- 2) identification of program participation status and sufficient information to determine eligibility for nonparticipants

3) nutrition- or health-related measures that might be useful in studying program impacts or in describing relevant characteristics of program participants and non-participants.

Thirteen data sources were classified as principal sources that appear to have the greatest potential for conducting research on food assistance and nutrition programs' outcomes. Another 13 sources could be made more useful for future food assistance research if questions were incorporated to fill gaps in relevant information.

#### ***FANRP examines sources of data on the use and impact of food assistance and nutrition programs on Indian reservations***

American Indians are more likely than other Americans to be poor, food insecure, hungry, obese, and diabetic. National surveys on food and nutrition assistance program use and nutritional status provide limited information about American Indians and Alaska Natives, because of their relatively small numbers and dispersed population. To inform decisions on future efforts to collect data and support research, Finegold et al. (2005) reviewed existing data sources and prior research on six programs that provide food assistance to American Indians living on or near reservations: the Food Distribution Program on Indian Reservations, the Food Stamp Program, WIC, the National School Lunch Program, the School Breakfast Program, and the Commodity Supplemental Food Program. The study reviewed 26 surveys conducted at the national, State, or tribal level and the extent to which they provide information on population characteristics (for both participants and eligible nonparticipants), program participation, and health and nutrition outcomes.



## ADDRESSING THE FUTURE



Since its establishment in 1998, FANRP has become the Nation's foremost source of economic research on USDA's food and nutrition assistance programs. Integrating an intramural and extramural program of research has resulted in an extensive portfolio of successful research projects. In just a decade, these FANRP-based studies have resulted in an impressive body of research publications. Findings from the research projects have informed public debate on a wide range of issues on the various food and nutrition assistance programs, such as gauging the effectiveness of program targeting and delivery, program effects on the lives of needy Americans, and program dynamics and administration. FANRP has expanded understanding on other policy-relevant topics such as the programs' linkages with the economy, the impacts of welfare reform, the causes and consequences of childhood obesity, and the development of new dietary references. FANRP is the national leader of Federal research on food security in the United States and has played a leading role in research on the impacts of income volatility on food assistance.

While much has been accomplished, there is still much work to do. For example, FANRP's review of food and nutrition assistance research concluded that the effects of food and nutrition assistance programs on nutrition and health outcomes of participants are still largely uncertain. In some cases, program operations

changed substantially after most of the existing research was completed. In other cases, earlier research may have been based on outdated assessment methods. FANRP has begun to address these limitations by:

- 1) funding research that has contributed to the development of several new dietary reference standards, based on the latest scientific knowledge, that can be used in assessing and monitoring the diets and health of program participants as well as nonparticipants
- 2) establishing baselines from which to monitor the nutritional and health characteristics of Americans over time, focusing on the low-income population.

As new food and nutrition assistance policy issues continue to emerge, FANRP is laying the groundwork for future research and evaluations. Because FANRP recognizes that evaluating new issues is complicated by the difficulties and cost of collecting timely, representative data, we have made data development a major priority. Investments in new and ongoing data collections will provide the critical foundation for addressing emerging food and nutrition assistance issues in a timely manner. Adding a food and nutrition assistance dimension to large national surveys has proven to be one of our most cost-effective investments in expanding research capital. FANRP's annual identification of priority areas

of research makes certain that future projects will be topical and relevant.

Building on its successful first decade, FANRP will use its strong research base to provide scientifically rigorous and objective studies and evaluations. As in the past, FANRP studies will enhance understanding and help to shape the public debate on food and nutrition assistance programs and policies. The findings from all FANRP research will continue to be publicly available, widely disseminated, and transparent. By focusing on today's problems while addressing tomorrow's issues, FANRP will help ensure a healthy, well-nourished America.

# REFERENCES

- Bartfeld, J., R. Dunifon, M. Nord, and S. Carlson. *What Factors Account for State-to-State Differences in Food Security*, Economic Information Bulletin No. 20, USDA, ERS, November 2006.
- Bartlett, S., N. Burstein, and W. Hamilton. *Food Stamp Program Access Study: Final Report*, E-FAN 03013-3, USDA, ERS, November 2004.
- Bell, L., and S. Gleason. *Using Point-of-Purchase Data To Evaluate Local WIC Nutrition Education Interventions: Feasibility Study*, Contractor and Cooperator Report No. 26, USDA, ERS, January 2007.
- Bell, L., S. Pachikara, S. Williams, and V. Gabor. *Re-Engineering the Welfare System – A Study of Administrative Changes to the Food Stamp Program: Final Report*, Food Assistance and Nutrition Research Report No. 17, USDA, ERS, July 2002.
- Bhattacharya, J., J. Currie, and S. Haider. *Evaluating the Impact of School Nutrition Programs: Final Report*, E-FAN 04-008, USDA, ERS, July 2004.
- Bogen, D., B. Hanusa, and R. Whitaker. "The Effect of Breast-Feeding with and without Formula Use on the Risk of Obesity at 4 Years of Age," *Obesity Research*, Vol. 12, No. 9, September 2004.
- Borjas, G. "Food Insecurity and Public Assistance," *Journal of Public Economics*, Vol. 88, Issues 7-8, July 2004.
- Botsko, C., V. Gabor, S. Schreiber, and S. Pachikara. *State Use of Funds To Increase Work Slots for Food Stamp Recipients: Report to Congress*, Food Assistance and Nutrition Research Report No. 15, USDA, ERS, August 2001.
- Boumtje, P., C. Huang, J. Lee, and B. Lin. "Dietary Habits, Demographics, and the Development of Overweight and Obesity Among Children in the United States," *Food Policy*, Vol. 30, Issue 2, April 2005.
- Buzby, J., and J. Guthrie. *Plate Waste in School Nutrition Programs: Final Report to Congress*, E-FAN-02-009, USDA, ERS, March 2002.
- Buzby, J., J. Guthrie, and L. Kantor. *Evaluation of the USDA Fruit and Vegetable Pilot Program: Report to Congress*, E-FAN 03-006, USDA, ERS, April 2003.
- Cody, S., P. Gleason, B. Schechter, M. Satake, and J. Sykes. *Food Stamp Program Entry and Exit: An Analysis of Participation Trends in the 1990s*, Contractor and Cooperator Report No. 8, USDA, ERS, July 2005.
- Cody, S., and J. Ohls. *Evaluation of the USDA Elderly Nutrition Demonstrations: Volume I, Evaluation Findings*, CCR-9-1, July 2005.
- Cole, N. *Feasibility and Accuracy of Record Linkage To Estimate Multiple Program Participation: Volume I, Record Linkage Issues and Results of the Survey of Food Assistance Information Systems*, E-FAN 03-008-1, USDA, ERS, June 2003.
- Cole, N., and M. Fox. *Nutrition and Health Characteristics of Low-Income Populations: Volume IV, Older Adults*, E-FAN-04-014-4, USDA, ERS, December 2004a.
- Cole, N., and M. Fox. *Nutrition and Health Characteristics of Low-Income Populations: Volume II, WIC Participants and Nonparticipants*, E-FAN-04-014-2, USDA, ERS, December 2004b.
- Cook, J., D. Frank, C. Berkowitz, M. Black, P. Casey, D. Cutts, A. Meyers, N. Zaldivar, A. Skalicky, S. Levenson, T. Heeren, and M. Nord. "Food Insecurity is Associated with Adverse Health Outcomes among Human Infants and Toddlers," *Journal of Nutrition*, Vol. 134, Issue 6, June 2004.
- Crepinsek, M., and N. Burstein. *Maternal Employment and Children's Nutrition: Volume I, Diet Quality and the Role of the CACFP*, E-FAN-04-006-1, USDA, ERS, June 2004a.
- Crepinsek, M., and N. Burstein. *Maternal Employment and Children's Nutrition: Volume II, Other Nutrition-Related Outcomes*, E-FAN-04-006-2, USDA, ERS, June 2004b.
- Cullen, K., K. Watson, I. Zakeri, and K. Ralston. "Exploring Changes in Middle-School Student Lunch Consumption After Local School Food Service Policy Modifications," *Public Health Nutrition*, Vol. 9, No. 6, September 2006.
- Dagata, E. *Issues in Food Assistance – Assessing the Self-Sufficiency of Food Stamp Leavers*, Food Assistance and Nutrition Research Report No. 26-8, USDA, ERS, September 2002.
- Datar, A., and R. Sturm. "Childhood Overweight and Elementary School Outcomes," *International Journal of Obesity*, Vol. 30, Issue 9, September 2006.



- Davis, D., and E. Leibtag. *Interstate Variation in WIC Food Package Costs: The Role of Food Prices, Caseload Composition, and Cost-Containment Practices*, Food Assistance and Nutrition Research Report No. 41, USDA, ERS, January 2005.
- Devaney, B., M. Crepinsek, K. Fortson, and L. Quay. *Review of Dietary Reference Intakes for Selected Nutrients: Challenges and Implications for Federal Food and Nutrition Policy*, Contractor and Cooperator Report No. 28, USDA, ERS, February 2007.
- Devaney, B., M. Kim, A. Carriquiry, and G. Camaño-Garcia. *Assessing the Nutrient Intakes of Vulnerable Subgroups*, Contractor and Cooperator Report No. 11, USDA, ERS, October 2005.
- Farrell, M., M. Fishman, M. Langley, and D. Stapleton. *The Relationship of Earnings and Income to Food Stamp Participation: A Longitudinal Analysis*, E-FAN 03-011, USDA, ERS, November 2003.
- Figlio, D., C. Gundersen, and J. Ziliak. "The Effects of the Macroeconomy and Welfare Reform on Food Stamp Caseloads," *American Journal of Agricultural Economics*, Vol. 82, No. 3, August 2000.
- Finegold, K., N. Pindus, L. Wherry, S. Nelson, T. Triplett, and R. Capps. *Background Report on the Use and Impact of Food Assistance Programs on Indian Reservations*, Contractor and Cooperator Report No. 4, USDA, ERS, January 2005.
- Foot, J., S. Murphy, L. Wilkens, P. Basiotis, and A. Carlson. "Dietary Variety Increases the Probability of Nutrient Adequacy Among Adults," *The Journal of Nutrition*, Vol. 134, Issue 7, July 2004.
- Fox, M., and N. Cole. *Nutrition and Health Characteristics of Low-Income Populations: Volume I, Food Stamp Participants and Nonparticipants*, E-FAN-04-014-1, USDA, ERS, December 2004a.
- Fox, M., and N. Cole. *Nutrition and Health Characteristics of Low-Income Populations: Volume III, School-Age Children*, E-FAN-04-014-3, USDA, ERS, December 2004b.
- Fox, M., W. Hamilton, and B. Lin. *Effects of Food Assistance and Nutrition Programs on Nutrition and Health, Volume 3, Literature Review*, Food Assistance and Nutrition Research Report No. 19-3, USDA, ERS, October 2004.
- Frongillo, E., D. Jyoti, and S. Jones. "Food Stamp Program Participation Is Associated with Better Academic Learning Among School Children," *Journal of Nutrition*, Vol. 136, Issue 4, April 2006.
- Gable, S., Y. Chang, and J. Krull. "Television Watching and Frequency of Family Meals are Predictive of Overweight Onset and Persistence in a National Sample of School-Aged Children," *Journal of the American Dietetic Association*, January 2007, Vol. 107, No. 1.
- Gleason, P., T. Tasse, K. Jackson, and P. Nemeth. *Direct Certification in the National School Lunch Program – Impacts on Program Access and Integrity: Final Report*, E-FAN-03-009, USDA, ERS, October 2003.
- Gleason, P., C. Trippe, S. Cody and J. Anderson. *The Effects of Welfare Reform on the Characteristics of the Food Stamp Population*, Mathematica Policy Research, Inc., July 2001.
- Goerge, R., M. Reidy, S. Lyons, M. Chin, and A. Harris. *Understanding the Food Stamp Program Participation Decisions of TANF Leavers*, E-FAN-04-011, USDA, ERS, September 2004.
- Gordon, A., and R. Briefel. *Feeding Low-Income Children When School Is Out – The Summer Food Service Program: Executive Summary*. Food Assistance and Nutrition Research Report No. 30, April 2003.
- Gordon, A., H. Hartline-Grafton, and R. Nogales. *Innovative WIC Practices: Profiles of 20 Programs*, E-FAN-04-007, USDA, ERS, June 2004.
- Gundersen, C., and J. Gruber. "The Dynamic Determinants of Food Insecurity" in *Second Food Security Measurement and Research Conference, Volume II: Papers*, (Andrews, M., and M. Prell, eds.), Food Assistance and Nutrition Research Report No. 11-2, USDA, ERS, July 2001.
- Gundersen, C., and V. Oliveira. "The Food Stamp Program and Food Insecurity," *American Journal of Agricultural Economics*, Vol. 83, No. 4, November 2001.
- Gundersen, C., and J. Ziliak. "The Role of Food Stamps in Consumption Stability," *The Journal of Human Resources*, Vol. 38, 2003 Supplement, 2003.
- Guthrie, J., E. Frazao, M. Andrews, and D. Smallwood. "Improving Food Choices – Can Food Stamps Do More?" *Amber Waves*, Vol. 5, Issue 2, USDA, ERS, April 2007.
- Hamilton, W., N. Burstein, and M. Crepinsek. *Reimbursement Tiering in the CACFP: Summary Report to Congress on the Family Child Care Homes Legislative Changes Study*, Food Assistance and Nutrition Research Report No. 22, USDA, ERS, March 2002.
- Hamilton, W., and P. Rossi. *Effects of Food Assistance and Nutrition Programs on Nutrition and Health: Volume 1, Research Design*, Food Assistance and Nutrition Research Report No. 19-1, USDA, ERS, February 2002.

- Hanson, K. *Food Assistance Research Brief—Importance of Child Nutrition Programs to Agriculture*, Food Assistance and Nutrition Research Report No. 34-12, USDA, ERS, July 2003.
- Hanson, K., and E. Golan. *Issues in Food Assistance: Effects of Changes in Food Stamp Expenditures Across the U.S. Economy*, Food Assistance and Nutrition Research Report No. 26-6, USDA, ERS, August 2002.
- Hanson, K., and C. Gundersen. *Issues in Food Assistance—How Unemployment Affects the Food Stamp Program*, Food Assistance and Nutrition Research Report No. 26-7, USDA, ERS, September 2002.
- Hanson, K., E. Golan, S. Vogel, and J. Olmsted. *Tracing the Impacts of Food Assistance Programs on Agriculture and Consumers: A Computable General Equilibrium Model*, Food Assistance and Nutrition Research Report No. 18, USDA, ERS, May 2002.
- Hanson, K., and V. Oliveira. *The 2005 Gulf Coast Hurricanes' Effect on Food Stamp Program Caseloads and Benefits Issued*, Economic Research Report Number 37, USDA, ERS, February 2007.
- Hanson, K., and K. Hamrick. *Moving Public Assistance Recipients Into the Labor Force, 1996-2000*, Food Assistance and Nutrition Research Report No. 40, USDA, ERS, May 2004.
- Herman, D., G. Harrison, and E. Jenks. "Choices Made by Low-Income Women Provided with an Economic Supplement for Fresh Fruit and Vegetable Purchase," *Journal of the American Dietetic Association*, Vol. 106, No. 5, May 2006.
- Hartline-Grafton, H., R. Nyman, R. Briefel, and R. Cohen, *Prototype Notebook: Short Questions on Dietary Intake, Knowledge, Attitudes, and Behaviors*, E-FAN-04-010, USDA, ERS, September 2004.
- Hofferth, S. *Persistence and Change in the Food Security of Families With Children, 1997-99*, E-FAN-04-001, USDA, ERS, March 2004.
- Hofferth, S., and S. Curtin. "Poverty, Food Programs, and Childhood Obesity," *Journal of Policy Analysis and Management*, Vol. 24, Issue 4, Fall 2005.
- Institute of Medicine. *Dietary Risk Assessment in the WIC Program*, Committee on Dietary Risk Assessment in the WIC Program, Food and Nutrition Board, Washington, DC: The National Academies Press, 2002.
- Institute of Medicine. *Dietary Reference Intakes: Applications in Dietary Assessment*. Washington, DC: National Academy Press, 2000.
- Institute of Medicine. *Dietary Reference Intakes: Applications in Dietary Planning*. Washington, DC: National Academy Press, 2003.
- Jacobson, J., N. Rodriguez-Planas, L. Puffer, E. Pas, and L. Taylor-Kale. *The Consequences of Welfare Reform and Economic Change for the Food Stamp Program—Illustrations from Microsimulation: Final Report*, E-FAN-01-003, USDA, ERS, January 2001.
- Jensen, H., S. Garasky, C. Wessman, and S. Nusser. *Iowa Food Stamp Leavers Survey: Final Report*, E-FAN-02014-1, USDA, ERS, July 2002.
- Jolliffe, D. "Extent of Overweight Among U.S. Children and Adolescents from 1971 to 2001," *International Journal of Obesity*, Vol. 28, No. 1, January 2004.
- Jolliffe, D., L. Tiehen, C. Gunderen, and J. Winiki. *Food Stamp Benefits and Childhood Poverty in the 1990s*, Food Assistance and Nutrition Research Report No. 33, USDA, ERS, September 2003.
- Joyce, T., D. Gibson, and S. Colman. "The Changing Association Between Prenatal Participation in WIC and Birth Outcomes in New York City," *Journal of Policy Analysis and Management*, Vol. 24, Issue 4, Fall 2005.
- Just, D., L. Mancino, and B. Wansink. *Could Behavioral Economics Help Improve Diet Quality for Nutrition Assistance Program Participants?* Economic Research Report No. 43, USDA, ERS, May 2007.
- Kabbani, N., and M. Kmeid, "The Role of Food Assistance in Helping Food Insecure Households Escape Hunger," *Review of Agricultural Economics*, Vol. 27, No. 3, Fall 2005.
- Kabbani, N., and P. Wilde. "Short Recertification Periods in the U.S. Food Stamp Program," *The Journal of Human Resources*, Vol. 38, 2003 Supplement, 2003.
- King, R., E. Leibtag, and A. Behl. *Supermarket Characteristics and Operating Costs in Low-Income Areas*, Agricultural Economic Report No. 839, USDA, ERS, December 2004.
- Kirlin, J., N. Cole, and C. Logan. *Assessment of WIC Cost-Containment Practices: Executive Summary*, Food Assistance and Nutrition Research Report No. 31, USDA, ERS, May 2003.
- Kirlin, J., and C. Logan. *Effects of EBT Customer Service Waivers on Food Stamp Recipients: Final Report*, Food Assistance and Nutrition Research Report No. 23, USDA, ERS, April 2002.
- Kornfeld, R. *Explaining Recent Trends in Food Stamp Program Caseloads: Final Report*, E-FAN-02-008, USDA, ERS, March 2002.
- Laraia, B., A. Siega-Riz, C. Gundersen, and N. Dole. "Psychosocial Factors and Socioeconomic Indicators are Associated with Household Food Insecurity Among Pregnant

- Women," *Journal of Nutrition*, Vol. 136, Issue 1, January 2006.
- Lee, J., and E. Frongillo. "Nutritional and Health Consequences Are Associated with Food Insecurity among U.S. Elderly Persons," *Journal of Nutrition*, Vol. 131, Issue 5, May 2001.
- Lee, B. J., L. Mackey-Bilaver, and M. Chin. *Effects of WIC and Food Stamp Program Participation on Child Outcomes*, Contractor and Cooperator Report No. 27, USDA, ERS, December 2006.
- Lin, B. *Nutrition and Health Characteristics of Low-Income Populations: Body Weight Status*, Agriculture Information Bulletin No. 796-3, USDA, ERS, February 2005.
- Logan, C., M. Fox, and B. Lin. *Effects of Food Assistance and Nutrition Programs on Nutrition and Health: Volume 2, Data Sources*, Food Assistance and Nutrition Research Report No. 19-2, USDA, ERS, September 2002.
- Logan, C., W. Rhodes, and J. Sabia. *Food Stamp Program Costs and Error Rates, 1989-2001*, Contractor and Cooperator Report No. 15, January 2006.
- Mancino, L., and C. Newman. *Who Has Time To Cook? How Family Resources Influence Food Preparation*, Economic Research Report No. 40, USDA, ERS, May 2007.
- McKernan, S., and C. Ratcliffe. *Employment Factors Influencing Food Stamp Program Participation: Final Report*, E-FAN 03-012, USDA, ERS, November 2003.
- McIntosh, A., G. Davis, R. Nayga, Jr., J. Anding, C. Torres, K. Kubena, E. Perusquia, G. Yeley, and W. You. *Parental Time, Role Strain, and Children's Fat Intake and Obesity-Related Outcomes*, Contractor and Cooperator Report No. 19, USDA, ERS, June 2006.
- Mills, G., and R. Kornfeld. *Study of Arizona Adults Leaving the Food Stamp Program: Final Report*, E-FAN-01-001, USDA, ERS, December 2000.
- Mills, G., D. Laliberty, and C. Rodger. *Food Stamp Certification Periods and Payment Accuracy: State Experience During 1997-2001*, E-FAN No. 04012, USDA, ERS, November 2004.
- National Research Council. *Estimating Eligibility and Participation for the WIC Program: Final Report*. Panel to Evaluate the USDA's Methodology for Estimating Eligibility and Participation for the WIC Program, M. Ver Ploeg and D. Betson, eds., Committee on National Statistics, Division of Behavioral and Social Sciences and Education, Washington, DC: The National Academies Press, 2003.
- National Research Council. *Food Insecurity and Hunger in the United States: An Assessment of the Measure*. Committee on National Statistics, Panel to Review the U.S. Department of Agriculture's Measurement of Food Insecurity and Hunger, G. Wunderlich and J. Norwood, eds., Washington, DC: The National Academies Press, 2006.
- Newman, C. *The Income Volatility Sawsaw: Implications for School Lunch*, Economic Research Report No. 23, USDA, ERS, August 2006.
- Newman, C., and K. Ralston. *Profiles of Participants in the National School Lunch Program: Data From Two National Surveys*, Economic Information Bulletin No. 17, USDA, ERS, August 2006.
- Nord, M., M. Andrews, and S. Carlson. *Household Food Security in the United States, 2005*, Economic Research Report No. 29, USDA, ERS, November 2006.
- Nord, M., and L. Kantor. "Seasonal Variation in Food Insecurity Is Associated with Heating and Cooling Costs among Low-Income Elderly Americans," *The Journal of Nutrition*, Vol. 136, Issue 11, November 2006.
- Nord, M., and K. Romig. "Hunger in the Summer," *Journal of Children and Poverty*, Vol. 12, No. 2, September 2006.
- Ohls, J., F. Saleem-Ismael, R. Cohen, B. Cox, and L. Tiehen. *The Emergency Food Assistance System – Findings From the Provider Survey, Volume II: Final Report*, Food Assistance and Nutrition Research Report No. 16-2, USDA, ERS, August 2002.
- Oliveira, V. *The Food Assistance Landscape: FY 2006 Annual Report*, Economic Information Bulletin No. 6-4, USDA, ERS, February 2007.
- Oliveira, V., and R. Chandran. *Children's Consumption of WIC-Approved Foods*, Food Assistance and Nutrition Research Report No. 44, USDA, ERS, February 2005.
- Oliveira, V., and D. Davis. *Recent Trends and Economic Issues in the WIC Infant Formula Rebate Program*, Economic Research Report No. 22, USDA, ERS, August 2006.
- Oliveira, V., M. Prell, D. Smallwood, and E. Frazão. *WIC and the Retail Price of Infant Formula*, Food Assistance and Nutrition Research Report No. 39, USDA, ERS, June 2004.
- ORC Macro. *Developing Effective Wording and Format Options for a Children's Nutrition Behavior Questionnaire for Mothers of Children in Kindergarten*, Contractor and Cooperator Report No. 10, USDA, ERS, August 2005.

- Pettigrew, I., J. Kuchak, and L. Ghelfi. *Administrative Costs in the Child and Adult Care Food Program: Results of an Exploratory Study of the Reimbursement System for Sponsors of Family Child Care Homes, Contractor and Cooperator Report No. 16*, USDA, ERS, March 2006.
- Quint, J. and R. Widom. *Post-TANF Food Stamp and Medicaid Benefits: Factors That Aid or Impede Their Receipt*, Manpower Demonstration and Research Corporation (MDRC), January 2001.
- Rangarajan, A., and P. Gleason. *Food Stamp Leavers in Illinois—How Are They Doing Two Years Later? Final Report*, E-FAN-01-002, USDA, ERS, January 2001.
- Ribar, D., and K. Hamrick. *Dynamics of Poverty and Food Sufficiency*, Food Assistance and Nutrition Research Report No. 36, USDA, ERS, September 2003.
- Richardson, P., G. Scoenfeld, S. LaFever, F. Jackson, and M. Tecco. *Food Stamp Leavers Research Study—Study of Nonwelfare Families Leaving the Food Stamp Program in South Carolina: Final Report*, E-FAN 03-003, USDA, ERS, March 2003.
- Skalicky, A., A. Meyers, W. Adams, Z. Yang, J. Cook, and D. Frank. "Child Food Insecurity and Iron Deficiency Anemia in Low-Income Infants and Toddlers in the United States," *Maternal Child Health Journal*, Vol. 10, No. 2, March 2006.
- Sturm, R., and A. Datar. "Body Mass Index in Elementary School Children, Metropolitan Area Food Prices and Food Outlet Density," *Public Health*, Vol. 119, Issue 12, December 2005.
- Swann, C. "The Timing of Prenatal WIC Participation," *The B.E. Journal of Economic Analysis and Policy*, Vol. 7, Issue 1, January 2007.
- Trippe, C., L. Schott, N. Wemmerus, , and A. Burwick. *Simplified Reporting and Transitional Benefits in the Food Stamp Program—Case Studies of State Implementation: Final Report*, E-FAN-04-003, USDA, ERS, May 2004.
- Weimer, J. *The Economic Benefits of Breastfeeding: A Review and Analysis*, Food Assistance and Nutrition Research Report No. 13, USDA, ERS, March 2001.
- Whitaker, R. "Predicting Preschooler Obesity at Birth: The Role of Maternal Obesity in Early Pregnancy," *Pediatrics*, Vol. 114, No. 1, July 2004.
- Whitaker, R., and S. Orzol. "Obesity Among US Urban Preschool Children: Relationships to Race, Ethnicity, and Socioeconomic Status," *The Archives of Pediatrics & Adolescent Medicine*, Vol. 160, No. 6, June 2006.
- Whitaker, R., S. Phillips, and S. Orzol. "Food Insecurity and the Risks of Depression and Anxiety in Mothers and Behavior Problems in their Preschool-Aged Children," *Pediatrics*, Vol. 118, No. 3, September 2006.
- Whitener, L., B. Weber, and G. Duncan. *Issues in Food Assistance—Reforming Welfare: What Does It Mean for Rural Areas?* Food Assistance and Nutrition Research Report No. 26-4, USDA, ERS, June 2002.
- Wilde, P., P. Cook, C. Gundersen, M. Nord, and L. Tiehen. *The Decline in Food Stamp Participation in the 1990's*, Food Assistance and Nutrition Research Report No. 7, USDA, ERS, June 2000a.
- Wilde, P., and E. Dagata. "Food Stamp Participation by Eligible Older Americans Remains Low," *FoodReview*, Vol. 25, Issue 2, Summer-Fall 2002.
- Wilde, P., P. McNamara, and C. Ranney. *The Effect on Dietary Quality of Participation in the Food Stamp and WIC Programs*, Food Assistance and Nutrition Research Report No. 9, USDA, ERS, September 2000b.
- Wilde, P., and C. Ranney. "The Monthly Food Stamp Cycle: Shopping Frequency and Food Intake Decisions in an Endogenous Switching Regression Framework," *American Journal of Agricultural Economics*, Vol. 82, No. 1, February 2000.
- Variyam, J. "Overweight Children: Is Parental Nutrition Knowledge a Factor?" *FoodReview* Vol. 24, Issue 2, USDA, ERS, May-August 2001.
- Ver Ploeg, S. "Food Stamps and Obesity: Ironic Twist or Complex Puzzle?" *Amber Waves*, Vol. 4, Issue 1, USDA, ERS, February 2006.
- World Health Organization, Department of Nutrition for Health and Development. *WHO Child Growth Standards: Methods and Development*, WHO Press, Geneva, Switzerland, 2006.
- Yen, S., and B. Lin. "Beverage Consumption Among U.S. Children and Adolescents: Full-Information and Quasi Maximum-Likelihood Estimation of a Censored System," *European Review of Agricultural Economics*, Vol. 29, Issue 1, March 2002.
- Ziliak, J., C. Gundersen, and D. Figlio. "Food Stamp Caseloads Over the Business Cycle," *Southern Economic Journal*, Vol. 69, No. 4, April 2003.

# APPENDIX

## BROADENING PARTICIPATION IN RESEARCH

### *Awarded FANRP Projects, Fiscal 1998-2007*

#### **Institutions:**

Abt Associates Inc.  
ACNielsen  
ATMS  
Boston Medical Center  
Brookings Institution  
Cancer Research Center of Hawaii  
Channing Laboratory, Brigham and Women's Hospital  
Child Trends  
Children's Hospital Medical Center (Cincinnati)  
Committee on National Statistics  
Health Systems Research  
Information Resources, Inc.  
IQ Solutions  
Life Sciences Research Organization  
Lewin Group  
Macro International  
Manpower Demonstration Research Corporation  
Mary Imogene Bassett Hospital  
Mathematica Policy Research, Inc.  
National Academy of Sciences  
National Bureau of Economic Research  
National Science Foundation  
ORC Macro, Inc.  
Pacific Institute for Research and Evaluation  
RAND Corporation  
Research Triangle Institute, Inc.  
Resource Network International  
Rockefeller Institute of Government  
Society for Nutrition Education  
Sphere Institute  
United Nations University Centre  
Urban Institute  
World Health Organization

#### **Universities:**

Albert Einstein College of Medicine  
Auburn University  
Baylor University  
Boston University  
Carnegie Mellon University  
Cornell University  
George Washington University  
Harvard University  
Iowa State University  
Johns Hopkins University  
Northwestern University  
Louisiana Tech University  
Medical College of Georgia Research Institute, Inc.  
Middle Tennessee State University  
North Carolina State University  
Nova Scotia Agricultural College  
Oregon State University  
Mississippi State University  
South Dakota State University  
Syracuse University  
Texas A&M University  
Tufts University  
Tulane University  
University of Arizona  
University of Baltimore  
University of California-Berkeley  
University of California, Davis  
University of Chicago  
University of Georgia  
University of Houston  
University of Illinois  
University of Kansas Medical Center  
University of Kentucky  
University of Massachusetts  
University of Michigan  
University of Minnesota  
University of Missouri  
University of Notre Dame  
University of North Carolina  
University of Nevada  
University of New Mexico  
University of Oregon

University of South Carolina  
University of Southern Mississippi  
University of Tennessee  
University of Utah  
University of West Virginia  
University of Wisconsin  
Virginia Polytechnic Institute and State University

#### **Government Agencies:**

Agricultural Research Service, USDA  
Center for Nutrition Policy and Promotion, USDA  
Food and Drug Administration  
Food and Nutrition Service, USDA  
National Agricultural Library, USDA  
National Center for Education Statistics,  
U.S. Department of Education  
South Carolina Social Services  
U.S. Census Bureau  
U.S. Department of Health and Human Services  
U.S. Department of Housing and Urban Development  
USDA Graduate School  
Virginia Department of Social Services

#### *Projects Awarded Through the RIDGE Program (Formerly the Small Grants Program), Fiscal 1998-2006*

Alabama A&M University  
Alcorn State University  
American University of Beirut  
Auburn University  
Baruch College, City University of New York  
Blackfeet Community College  
Bowling Green State University  
Brigham Young University  
Brown University  
Carnegie Mellon University  
Chief Dull Knife Memorial College  
Clark Atlanta University

Clemson University	Oklahoma State University	University of Michigan
Columbia University	Old Dominion University	University of Minnesota
Cornell University	Pennsylvania State University	University of Nevada, Reno
Dine Community College/ Shiprock Campus	Rutgers University	University of New Mexico
Drexel University	San Jose State University	University of North Carolina- Chapel Hill
Duke University	Si Tanka Community College/ Huron University	University of North Carolina- Greensboro
East Carolina University	Simmons College	University of Notre Dame
Florida A&M University	State University of New York at Stony Brook	University of Oregon
Florida State University	Syracuse University	University of Rhode Island
Fort Belknap College	Tennessee State University	University of South Mississippi
Fort Peck Community College	Texas A&M University	University of Tennessee
Hamilton College	Tohono O'odham Community College	University of Texas at Austin
Harvard University	Tufts University	University of Utah
Hopi Tribe Cooperative Extension Office	Tulane University School of Public Health	University of Virginia
Hunter College, City University of New York	Tuskegee University	University of Wisconsin
Iowa State University	University of Arizona	Virginia Commonwealth University
Johns Hopkins University	University of Arkansas-Fayetteville	Virginia Tech University
Keweenaw Bay Ojibwa Community College	University of Arkansas-Pine Bluff	Washington University
Little Priest Tribal College	University of California-Berkeley	Western Carolina University
Louisiana State University	University of California- Davis	Western Reserve University
Middle Tennessee State University	University of California-Los Angeles	White Earth Tribal and Community College
Mississippi State University	University of Chicago	Willamette University
North Carolina A&T State University	University of Connecticut	Yale University
North Carolina Central University	University of Hawaii	
Oglala Lakota College	University of Kentucky	
	University of Memphis	

**National Agricultural Library Cataloging Record:**

Food Assistance & Nutrition Research (Program: U.S.)  
 Informing food and nutrition assistance policy: 10 years of research at  
 ERS.  
 (Miscellaneous publication (United States. Dept. of Agriculture); no. 1598)  
 1. Food Assistance & Nutrition Research (Program: U.S.)—Anniversaries,  
 etc.  
 2. Food relief—United States—Evaluation.  
 3. Nutrition—Research—United States.  
 I. United States. Dept. of Agriculture. Economic Research Service. II. Title.  
 HV696.F6