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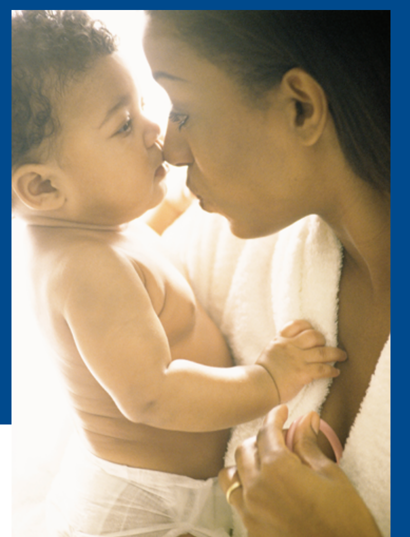
Food Assistance and Nutrition Research Innovation and Development Grants in Economics Program

Executive Summaries of 2005 Research Grants

T. Alexander Majchrowicz
Editor



Food Assistance and Nutrition Research Innovation and Development Grants in Economics Program

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Contractor and Cooperator Report No. 23
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T. Alexander Majchrowicz, editor

Abstract

This report summarizes research findings from the Food Assistance and Nutrition Research Innovation and Development Grants in Economics Program (RIDGE), formerly known as the Small Grants Program. The Economic Research Service created the program in 1998 to stimulate new and innovative research on food assistance and nutrition issues and to broaden the participation of social science scholars in these issues. The report includes summaries of the research projects that were awarded 1-year grants in summer and fall 2004. The results of these research projects were presented at the October 2005 Small Grants Program conference. The projects examine issues of childhood obesity, food insecurity among vulnerable populations, food assistance program participation and household well-being, and community influence on food assistance and dietary choices. Several of the projects focus on specific populations, such as people living in the rural South and those living on American Indian reservations.

Keywords: Food assistance, nutrition, food security, food insecurity, obesity, childhood obesity, food assistance, food spending, Food Stamp Program, food stamps, WIC, Food Assistance and Nutrition Research Program

The studies summarized herein were conducted under research grants with USDA's Economic Research Service (ERS) Food and Nutrition Assistance Research Program (FANRP).

Cover photo: Mother and baby by Eyewire, all others by Ken Hammond, USDA.

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Preface

The Economic Research Service's (ERS) Food Assistance and Nutrition Research Innovation and Development Grants in Economics (RIDGE) Program, formerly called the Small Grants Program, offers grants to social science scholars to stimulate new and innovative research on food and nutrition assistance and to broaden participation in research on these issues. Moreover, it seeks to nurture the development of strong networks of researchers who interact and work collaboratively on critical food and nutrition challenges that cross local or State borders. ERS partners with five academic institutions and research institutes to administer the program and to competively award grants for 1-year reasearch projects. Most grants are for $20,000 to $40,000.

This report presents summaries of the research findings from the sixth set of RIDGE awards, which were granted in summer and fall 2004. Preliminary findings were presented at a conference at ERS in Washington, DC, on October 27 and 28, 2005, and the research projects were completed in December 2005. More information about the RIDGE partners and many of the completed research papers can be found on the Websites of the administering institutions, listed below:

Institute for Research on Poverty, University of Wisconsin-Madison
Focus: The effects of food assistance programs on food security, income security, and other indicators of well-being among low-income individuals and families.
Web address: *http://www.irp.wisc.edu/initiatives/funding/usdasgp.htm*

Irving B. Harris School of Public Policy Studies, University of Chicago
Focus: Interactions between food assistance programs and other welfare programs and the effects of the macroeconomy on the need for food assistance, the level of participation, and costs of food assistance programs.
Web address: *http://www.jcpr.org/usdarfp.htm*

The American Indian Studies Program, University of Arizona
Focus: The relationship between food assistance programs on reservations and family poverty.
Web address: *http://w3.arizona.edu/~aisp/foodassistance/foodassistance1.htm*

The Department of Nutrition at the University of California, Davis
Focus: The impact of food assistance programs on nutritional risk indicators (anthropometric, biochemical, clinical, and dietary), food purchasing practices, and food insecurity.
Web address: *http://nutrition.ucdavis.edu/USDAERS/*

Southern Rural Development Center, Mississippi State University
Focus: Food assistance research issues impacting vulnerable rural people, families, and communities in the South.
Web address: *http://srdc.msstate.edu/focusareas/health/fa/food.htm*

Introduction

Federal food and nutrition assistance programs form a crucial component of the social safety net in the United States. Unlike a number of other social programs, food assistance programs provide benefits and have eligibility requirements that are essentially uniform nationwide. The Food Stamp Program (FSP)—the largest Federal food assistance program—is, with few exceptions, available to all Americans whose income and assets fall below certain levels. The other food assistance programs are generally targeted to specific demographic groups. Altogether, the 15 Federal food assistance programs collectively reach an estimated one in five Americans at some point each year. The U.S. Department of Agriculture (USDA), the Federal department charged with administering nearly all of the Federal food and nutrition assistance programs, has a particular interest in monitoring program effectiveness and contributing to the policy goal of a healthy, well-nourished population.

The purpose of the Research Innovation and Development Grants in Economics (RIDGE) Program, formerly known as the Small Grants Program, is to stimulate new research on food and nutrition policy issues and to broaden the participation of social science scholars in the research effort. Grant recipients come from a number of disciplines and employ a variety of approaches in their research. They include economists, sociologists, nutritionists, anthropologists, and public health professionals. Some use statistical models to analyze individual and household response to policy changes. Others conduct exploratory research using ethnographic methods to examine underlying factors influencing program participation and outcomes. Still others use descriptive statistics to characterize the populations of interest. All the research methods contribute to a growing body of literature on the food needs, coping behaviors, and food program outcomes of low-income families and individuals. The work supported by the RIDGE Program often inspires the development of new theories or research methodologies, elements that become the basis for securing expanded funding from other public or private sources to further develop these promising innovations.

RIDGE Program Partners

ERS created partnerships with five academic institutions and research institutes to administer the RIDGE Program. Partner institutions have the advantage of being closer to the particular regional and State environments that influence program delivery and outcomes. Each partner institution provides a different emphasis on food and nutrition assistance research.

ERS chose two of the five partner institutions for their experience in conducting policy-relevant poverty research at the national level. One of these is the Institute for Research on Poverty (IRP) at the University of Wisconsin-Madison. IRP has a history of research and policy evaluation, including previous involvement in administering small research grants funded by USDA's Food and Nutrition Service. The second partner is the Irving B. Harris Graduate School of Public Policy Studies at the University of Chicago. The Harris Graduate School of Public Policy, a part of the Joint Center for Poverty Research from 1996 to 2002, has a strong history in conducting and supporting research on what it means to be poor in America.

ERS chose the remaining three of the five partner institutions for their ability to direct research of policy interest to USDA, either on a particular subset of food assistance and nutrition issues or on a particular subpopulation of those eligible for food and nutrition assistance. Among these, the Department of Nutrition of the University of California at Davis brought to the RIDGE Program its expertise in nutrition education design and evaluation. A core faculty group focuses their research efforts on identifying meaningful approaches to the design and evaluation of nutrition education for ethnically diverse, low-income families served by a variety of food assistance programs. They view multidisciplinary research as critical to effectively monitoring the outcomes of nutrition programs.

The Southern Rural Development Center (SRDC) was chosen to administer the RIDGE awards for its ability and commitment to conduct research on the problems of the rural poor in the South and its particular commitment to study the effects of welfare reform on this population. USDA has special ties to the SRDC because of its close working relationship with the region's 29 land-grant universities. The South is also of particular interest to USDA because of the large proportion of rural poor and rural African-Americans who reside in the region.

American Indian families living on reservations are a significant component of the low-income rural population in many of the Western and Plains States. ERS chose the University of Arizona's American Indian Studies Program (AISP) to administer RIDGE awards for research on the food assistance and nutrition needs and problems of American Indians. AISP is the home of the only doctoral program in American Indian Studies in the country. The program maintains close ties to the tribal colleges, which were given land-grant status by Congress in 1994. AISP also reaches out to Native American scholars in a variety of academic settings.

Executive Summaries

Food Stamp Program Participation Levels and Impacts

Health Effects of the 1960s Food Stamp Program

Douglas Almond, Columbia University and National Bureau of Economic Research, and Kenneth Chay, University of California, Berkeley and National Bureau of Economic Research

The 1960s were a time of dramatic health improvement in the United States, especially for African-Americans. In the late 1960s, the mortality rate among Black infants—a common bellwether of population health—fell from more than 40 deaths per 1,000 live births to 30. In the process, the rate of infant death among Black infants converged on the lower mortality rate among Whites. The late 1960s was the only period of convergence in the mortality gap between Black and White infants in the post-World War II period.

Conditions of fetal and early-life health may exert a large effect on subsequent adult health. A previous study focused on the role of fetal undernutrition in "programming" chronic health conditions in adulthood, such as heart disease. A natural question, therefore, is whether the large improvement in infant health among Blacks improved adult health during the 1980s and 1990s. This pattern is indeed observed. When the authors use a dataset of mothers giving birth in the United States, they find that both health and education of African-Americans born in the late 1960s is substantially improved relative to health and education of infants born in the early 1960s. The improvement by birth cohort is much smaller among White mothers and is not observed for Black mothers who were not born in the United States. Therefore, infant health substantially improved in the late 1960s as did the adult health of the same infants 20-35 years later.

What lead to the historic improvement in Black health during the late 1960s? This question is difficult to answer given the sweeping policy and social changes of this period. These changes include the inception of both Medicare and Medicaid, as well as the passage of the 1964 Food Stamp Act, which provided $300 million to improve nutrition among the poor.

The goal of this paper is to assess the causal impact of the Food Stamp Program (FSP) on health, with a particular focus on the infant health of African-Americans. As the late 1960s witnessed major policy changes that could confound estimates of FSP effects, the major empirical challenge is to identify unique and exogenous FSP variation. Two basic approaches are used to evaluate impacts of the FSP. Both of these approaches analyze the initial rollout of the program by individual U.S. counties and compare health outcomes immediately before and after introduction of the FSP.

The first approach looks at health outcomes before passage of the national FSP in 1964. In the early 1960s, the first official act of the Kennedy Administration was to establish FSP pilot projects. Health outcomes in the eight counties that received a pilot project in 1962 are compared with (1) health outcomes in 1961 in the same eight counties and (2) health outcomes in

counties neighboring the eight pilot counties that did not receive a pilot project. The result is a conventional "differences in differences" estimate of the effect of FSP pilot programs on health. The initiation of projects during this period permits control for fixed factors that might affect infant health in different counties (i.e., county-fixed effects).

Analysis of pilot projects permits isolation of the effects of the FSP from Federal health initiatives that began during the subsequent Johnson Administration. However, the small scale of the pilot programs makes analysis of relatively rare events, like infant mortality, difficult. Therefore, this second approach focuses on the national rollout of the FSP. To distinguish FSP impacts from concurrent programs of the "Great Society," the discrete timing of program initiation by county is used. In particular, the study uses data collected in previous research to identify the month FSP began in each U.S. county. This second approach evaluates whether exposure to FSP during the prenatal period has an effect on infant mortality.

The two analytic approaches revealed that infant mortality fell with FSP exposure, especially for deaths occurring within the first month of life. Moreover, mortality reductions were larger among Black infants than among White infants. The study of pilot projects includes 33 counties in both 1961 and 1962. Neonatal mortality fell nearly 2 deaths per 1,000 live births with initiation of the FSP. This estimate is significant at the 10-percent level of significance, while effects for the post-neonatal period are approximately one-tenth as large and not significant at conventional levels. A preponderant effect on neonatal mortality is consistent with a primary role of improved prenatal conditions.

Data from the national rollout of the FSP permits analysis of the discrete timing of program initiation. Effects are again found for measures of newborn health, and birthweight in particular. Both White and Black infants were less likely to be born at low birthweights (below 2,500 grams) once the FSP began operation. The likelihood of low birthweight fell about 2 percent for Black infants and slightly under 1 percent for White infants.

Analysis of the FSP has been hampered by its regularity. Other major entitlement programs, notably AFDC, varied substantially at the State level, permitting analysis of State experiments with the program. The FSP program, by contrast, is relatively monolithic. From a research perspective, it is fortunate that the initial rollout of the FSP was not so regular. Counties had to wait until Congress raised the FSP appropriation to levels sufficient for nationwide coverage. In this process, counties queued for their turn. This gradual phase-in of the modern FSP generated ready "treatment" and "control" groups to the benefit of empirical analysis.

The modern FSP began at a time when many of America's poorest were starving. As late as 1964, 1,400 people died each year from hunger in the United States. Results of this study indicate that the FSP had substantial health benefits in reducing mortality, particularly among African-Americans infants. This success is more notable given the persistently high levels of infant mortality among African-American infants.

Moreover, the fetal-origins hypothesis predicts that the improved infant health generated by the FSP would have persistent effects on the adult health of the 1960s birth cohorts to this day, suggesting that the FSP has additional "multiplier" effects that have yet to be measured. Future research should identify datasets of adult health outcomes with information on the county and date of birth and analyze these potential long-term effects using the then-staggered phase-in of the modern FSP.

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Why Did the Food Stamp Caseload Decline (and Rise)? Effects of Policies and the Economy

Caroline Danielson, University of California, and Jacob Klerman, RAND

Over the past 15 years, the size of the total Food Stamp Program (FSP) caseload has varied widely. The number of FSP participants rose by 47 percent in the early 1990s, peaking in 1994 at 27.9 million. The caseload dropped 39 percent between 1994 and mid-2000 to 16.9 million participants. Since then, it has again risen sharply. In July 2004, the end of the period examined in the study, the total number of FSP participants stood at 24.4 million. Three factors are of special interest in understanding this path of the caseload: the economy, cash assistance policies, and FSP policies.

During the study period, economic conditions varied widely, and the social safety net was significantly redesigned. The unemployment rate peaked in the early 1990s and declined until mid-2000. It rose through 2003 and fell once again. Major changes to State welfare programs were intended to encourage work and increase welfare exit rates. The changes culminated in passage of the Federal Personal Responsibility and Work Opportunity Reconciliation Act (PRWORA) in 1996, which replaced Aid to Families with Dependent Children (AFDC) with the Temporary Assistance for Needy Families (TANF) program. The changes were also aimed at retaining and even strengthening other components of the social safety net—the Earned Income Tax Credit, Medicaid, and food stamps—for parents with children who complied with TANF program requirements but who were unable to achieve self-sufficiency through their own earnings.

However, a sharp FSP caseload decline during the same period as the welfare reforms of the mid-1990s led to concern that changes to State cash assistance programs embodied in their TANF plans were also disconnecting eligible recipients from other means-tested programs. In response to such concerns, legislation, including the Farm Security and Rural Investment Act of 2002, gave States opportunities to implement policies aimed at easing the burden of certifying and recertifying for food stamp benefits on families who were leaving cash assistance or who were combining cash assistance with earnings.

Monthly semiannual administrative data that report State FSP caseloads are used in the study. The analysis estimates the effects of FSP policies, welfare policies, and the economy on total FSP caseload and on two components of it: the portion combining cash assistance and food stamps and the portion receiving only food stamps.

Results show that welfare reform had a large negative impact on total FSP caseload. Findings indicate that if no State had implemented a waiver to its AFDC program and no State had implemented TANF, the total FSP caseload decline from January 1994 to July 2000 would have been 12.5 percentage points less than the actual 39-percent decline. In other words, the caseload would have declined only two-thirds as much as it actually did. On the other hand, if no State had implemented policies aimed at reducing the stigma and burden of benefit receipt, the caseload would have increased 13.7 percentage points less than the actual 44.5-percent increase from July 2000 through the end of the study data in July 2004. Therefore, these policies improved access to the FSP.

In the case of the economy, simulations indicate that, if the economy had never improved over the course of the 1990s, total FSP caseload would have declined only 13.4 percent instead of the actual 39-percent decline from January 1994 to July 2000. Had the economy not deteriorated in the early 2000s, total FSP caseload would have increased by 33.8 percent, a somewhat smaller increase than the observed 44.5 percent.

In summary, the analysis indicates that the improving economy, combined with implementation of TANF, explains the entire FSP caseload decline in the mid-1990s, while the weakening economy and policies aimed at increasing access to the FSP explain half of the increase in the 2000s. While the economy is twice as important as TANF implementation in explaining the drop in total caseload in the 1990s, FSP policy changes aimed at increasing access to the program among eligible families are somewhat more important than the economy in explaining the rise in the early 2000s. In addition, while the study does not find consistent effects of policies in the two portions of the caseload it examines separately (those combining cash assistance and food stamps and those receiving food stamps alone), the economy played a large role in the paths of both of the caseloads over the period.

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A New Approach To Forecasting the Food Stamp Caseload

Jeffrey Grogger, Harris Graduate School of Public Policy Studies,
University of Chicago

Over a span of less than 15 years, the FSP caseload has exhibited three prominent turning points. Caseload declined from 22.4 million participants in 1981 to 18.6 million in 1988. Between 1989 and 1994, it rose to an historical high of nearly 27.5 million people before plummeting to 17.1 million in 2000. Caseload then rebounded to 21.3 million people between 2000 and 2003.

Such extraordinary levels of volatility present a serious challenge to the agencies charged with operating the program. Although little can be done to reduce the volatility, the administrative challenges posed by that volatility could be reduced if more accurate caseload forecasting were possible.

This study develops an approach to forecasting based on a leading indicator suggested by Markov theory. The leading indicator is a function only of current entry and exit rates. Unlike conventional econometric forecasting, the approach developed does not require forecasts of future environmental conditions. The technique is applied to caseload data from California.

The results highlight both the advantages and limitations of the approach. On the plus side, the forecasts are fairly accurate and perform reasonably well in predicting a recent turning point. On the minus side, the horizon over which the approach produces forecasts is determined by the data, and in the case of the California data, they vary greatly between segments of the caseload. For the public aid segment, which includes households that receive cash welfare payments as well as Food Stamps, the approach yields forecasts 16 months ahead. However, for the non-aided segment, the forecast horizon is only 4 months. Thus, the approach yields relatively long-term forecasts for the aided segment but relatively short-term forecasts for the non-aided segment. The study finds that the forecast horizon appears to be related to the extent of turnover in the caseload.

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Grant awarded by The Harris School of Public Policy Studies,
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Outcomes of Food Assistance

An Ethnographic Study of the Factors Affecting the Nutritional Patterns of Navajo Women and Their Children in the WIC Program

Joanne McCloskey and Melvatha Chee, University of New Mexico

Many Navajo women and children, as well as other low-income women and children in the United States, are at dietary risk. The Federal Government's Special Supplemental Nutrition Program for Women, Infants, and Children (WIC) considers dietary risk based on an individual's food intake from a 24-hour recall questionnaire, or Food Frequency Query (FFQ). Rural locales, poverty, and high unemployment are major factors in availability and quality of food, as is the sharing of limited resources between extended family members. Many Navajos now rely on a cash economy rather than the traditional pastoral lifestyle of sheepherding and farming, which not only affects resource sharing but also nutritional value of available food.

This study focused on interviews with 44 women enrolled in the New Mexico Department of Health WIC clinic in Cuba, NM. Interviews were conducted by four employees at the Cuba WIC clinic after initial contact with and agreement by the participants. The women were residents of Torreon, Ojo Encino, or Counselor chapters or the small community of Cuba. The participants ranged in age from 18 to 43, and all were either pregnant or mothers of children enrolled in WIC; one was a grandmother of a 2-year-old enrolled in WIC.

The objectives of the study were to examine:

- The social, cultural, and economic factors that affect the eating patterns of Navajo women and their children.
- From the perspective of Navajo women and WIC staff members, the major concerns and challenges that affect the nutritional status of Navajo women and children.
- The major characteristics of the eating patterns of Navajo women and children.
- The positive effects of WIC on eating patterns of Navajo women and children.

The study found that eating patterns generally depended upon living arrangements. The majority of the participants lived near or with extended family members and shared food purchasing and preparation responsibilities, as well as accommodation for meal schedules. Food stamps and WIC assistance played a key role in the acquisition of food for the families. Another issue affecting eating patterns is that of transportation. Some mothers who do not own a vehicle or are unable to afford gas must rely on friends or family for transportation to and from the WIC office or the market. For example, WIC farmer's market coupons were provided to enrollees for markets in Albuquerque or Farmington. Those who did not

use the coupons blamed transportation as an obstacle to buying fresh goods at those locations.

Major concerns and challenges to nutritional status included weight, food insecurity, and healthy diet choices. Mothers expressed concern about their own weight and that of their children. Some expressed hope that WIC recipes and dietary information could assist in weight loss and management for family members. The diabetes rate is exceptionally high for Native people, and the study participants were concerned about their children's dietary habits now in order to prevent diabetes later. Challenges discussed by WIC personnel were the need for more information on nutrition and increased discussion and counseling regarding nutrition issues. Another concern of staffers was mothers who ran out of baby formula before the next available WIC check. Breastfeeding is encouraged by WIC, at least through the first year. The nutrition manager at the Cuba office stated that breastfeeding is on the rise among Navajo and that the sense of pride and support is growing for mothers who breastfeed.

Based on the 24-hour recall, eating patterns of the study participants indicated a lack of traditional foods in the diet. Fry bread and mutton stew are eaten rarely, usually at ceremonies or other celebrations only. Potatoes and corn were the most common vegetables consumed. Fast food, such as McDonald's hamburgers, soft drinks, and French fries, were listed among regular meals in a 24-hour span. Mothers indicated that fruits and vegetables were in short supply, but children enjoyed the orange juice provided by WIC as an alternative to sodas.

The study determined that WIC had made substantial progress in educating Navajo mothers about healthy foods. Because of this knowledge, Navajo mothers were more likely to consider food preparation (using less fat/lard), substituting milk or juice for soft drinks, and the addition of more and varied fruits and vegetables into the diet. Pregnant women in the study indicated that they were keeping food records and monitoring their diets in order to provide good nutrition for the unborn babies. Another positive outcome for Navajo women was the nutritional information for diabetics provided by WIC, not only for themselves but also for family members for which they did the food selecting, purchasing, and preparing.

The findings indicate that Navajo women exhibit some degree of food insecurity. Obesity and other health risks appear to coincide with food insecurity, and participation in WIC programs decreases the risk of obesity and other health risks. Of those participating in the study, women pregnant with first children and those who were obese exhibited the greatest interest in WIC nutrition programs that teach healthy diet choices. Participants stated, however, that providing on-site nutrition education in the rural chapters would allow more people to attend.

WIC staff members in the Cuba office being Navajo aided in the culturally appropriate delivery of information, and the flexibility of WIC office hours afforded the women open opportunities to pick up their checks and food packages.

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The University of Arizona

Educational Intervention To Modify Bottle-Feeding Behaviors Among Formula-Feeding Mothers in the WIC Program: Impact on Infant Formula Intake, Weight Gain, and Fatness

Kathryn G. Dewey, M. Jane Heinig, and Katie Kavanagh-Prochaska,
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One of the key factors associated with child obesity is a rapid rate of weight gain during infancy. Infant feeding practices are a major contributor to early rapid weight gain. Formula-fed infants consume more energy and gain weight more rapidly than breastfed infants, even during the first few months of life. Recent evidence indicates the effect of infant feeding on body fatness is long term, with children and adolescents who were breastfed being 20-30 percent less likely to be overweight than children who were formula fed. The mechanisms underlying these differences are not well understood. One possibility is that the composition of infant formulas has a stimulatory effect on intake and growth, although recent data from one of our own studies suggest that neither the protein content or quality, nor the potential renal solute load of formula, is the trigger. Another possibility is that bottle-feeding, not the composition of the milk in the bottle, is more important. One hypothesis is that infants are born with the ability to self-regulate their energy intake. The bottle-feeding caregiver may miss the infant's satiety cues or encourage the infant to empty the bottle.

The objective of this study was to evaluate whether formula-feeding caregivers who are encouraged to be more sensitive to their infants' satiety cues and to adopt feeding practices similar to those of breastfeeding mothers will in fact alter their feeding practices. The study further examined if this action results in a lower volume of formula consumed at 4 months of age and less rapid weight gain from 1-4 months of age.

This project was a double-blind, randomized educational intervention trial with exclusively formula-feeding caregivers in the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC) in Sacramento County. Some of the ideas for this intervention were the result of focus groups conducted with WIC mothers in spring 2003, which revealed that overfeeding formula-fed infants is common in this population.

The intervention group received education that promoted awareness of early satiety cues and discouraged the use of large bottles (greater than 6 ounces) before 4 months of age. The control group received standard nutrition education regarding introduction and feeding of solid foods. After initial screening, caregivers completed a baseline 2-day formula intake record and were then randomized to attend either the intervention or control nutrition education class. Subjects were stratified by infant sex and maternal language (English or Spanish) and were randomized using computer-generated stratified random lists with a block size of four. All subjects who attended the class were then followed for no less than 2 months post-class. Formula intake records were again completed at 2 weeks post-class and at approximately 3.5 months of age. At baseline and at about 4 months of age, infant anthropometry was completed. To identify underdilution or overdilution of formula, caregivers were asked to provide samples of prepared formula at baseline and at the end of the study.

Of the 836 caregivers screened at the 2 clinic sites, 214 were eligible and 104 were willing to participate in the study. The most common reason for refusal was lack of time. Barriers to participation included lack of transportation to the nutrition education class, uncertainty about ability to attend the class, and family or personal problems. Of the 104 women who agreed to participate, 101 completed the baseline questionnaire and 61 completed the first formula intake record. The remainder (n=43) did not complete the baseline intake record and therefore were not included in the randomized trial. In most of these cases, the research staff was never able to reconnect with the caregivers, even after multiple attempts.

Of the 61 caregivers who completed the first intake record and were randomized, 17 never attended the nutrition education class (16 had been scheduled for the class but did not show up even after repeated rescheduling). Of the 44 caregivers attending the nutrition education class, 40 caregivers completed the final formula intake record and 38 of these attended the final measurement session. Among the 40 caregivers who completed the final intake record, no significant differences emerged between intervention and control groups in maternal age, education, body mass index, number of children or ethnicity, or infant birth weight, sex, or formula intake at baseline.

Differences between groups were not significant in formula intake at the second record or at the end of the study, even after controlling for infant age at baseline, baseline intake, sex, birth weight, and time in the study. No significant differences emerged between groups in bottle-feeding behaviors at baseline or at the final intake record, including the mean percentage of bottles emptied, the percentage of subjects who emptied the bottle at more than 50 percent of feedings, and the percentage of bottles offered that were greater than 6 ounces. Bottle-emptying increased in both groups over time (from 50-60 percent of feedings), as did the use of bottles greater than 6 ounces (from less than 5 percent to about 17 percent of subjects).

Differences were not significant between groups in infant weight, length, or sum of skinfold thickness at baseline, after controlling for age and sex. However, by the end of the study, infants in the intervention group were heavier and longer than those in the control group, even after controlling for age at measurement, sex, baseline weight or length, and time in study. In addition, the sum of skinfold thickness was greater among infants in the intervention group than in the control group after controlling for age at measurement one, time in study, sex, and sum of skinfold thickness at baseline.

Response to the nutrition education class, followup phone call, and the key messages was overwhelmingly positive. Most caregivers in the intervention group could accurately repeat the key messages and the demonstrations used to transmit them and felt that they were easy to comply with and to share with friends and family. However, this response did not appear to translate into behavioral change.

The adult learning technique used for this intervention was designed for use in a group setting, but 95 percent of the classes were conducted with just one caregiver because of no-shows. Although the caregivers seemed to appreciate the one-on-one nature of the classes, the lack of group facilitation may be one reason for not achieving changes in feeding practices. Other

possibilities include (1) inadequate reinforcement of messages, (2) insufficient depiction of and/or practice with identifying satiety cues in human infants, (3) not intervening early enough in the feeding relationship to support and foster inherent infant self-regulation, (4) not following caregivers long enough to detect a potential change in bottle-feeding behaviors, and (5) other barriers to responsive feeding related to the desire for infants to cry infrequently and sleep more.

In summary, the results of this study indicate that formula intake by infants in this population are quite high—probably reflective of overfeeding—and that modifying bottle-feeding behaviors to prevent overfeeding is a challenging task. The more rapid growth of infants in the intervention group is difficult to explain, given that differences were not significant in the intake variables. The final sample size was quite small, and caregivers participating in the project were not representative of the WIC population in general, which limits the conclusions that can be drawn. However, even though caregivers did not report a difference in intake or bottle-feeding behaviors, the educational intervention was successful in improving knowledge and awareness of the key messages.

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Father Involvement, Food Program Participation, and Food Security Among Children With Nonresident Fathers

Steven Garasky and Susan D. Stewart, Iowa State University

The purpose of this study was to establish how involvement by a nonresident father—as measured through visitation and the payment of child support—affects the ability of the child's resident family to meet its food needs. In 2004, over 6 million children who resided with a single mother and had a father who lived elsewhere were food insecure. That is, these children did not always have access to enough food for active, healthy living because their household lacked money or other resources for food. About 1 in 10 (11.9 percent) of all U.S. households are food insecure. Access to food is a concern particularly for low-income single mothers with children; nearly half (48 percent) of them are food insecure. Even after the effects of income are accounted for, single mothers with children are more likely to be food insecure than married couples or single fathers with children.

As child support enforcement becomes more rigorous, it is important and timely to investigate how nonresidential parental involvement, which is encouraged by current policy affects food security. USDA offers a number of food and nutrition assistance programs, with the Food Stamp Program (FSP) serving as the first line of defense against hunger for low-income families. As such, it is the most researched of the programs. Yet, to date, no research has tested the effect of nonresident father involvement (child support and visitation) on FSP participation and food security.

The specific aim of this research was to establish the effects of involvement by fathers on food security. Multivariate analyses were employed to understand how the amount of child support received, the frequency and duration of a father's visits, and other important factors affect the likelihood that the child's resident family is food secure.

The analysis was based on the 1997 round of the National Survey of America's Families (NSAF). Designed to study the devolution of responsibility for social programs from the Federal Government to the States, the survey is representative of the noninstitutionalized, civilian population of people under age 65 in the Nation. The NSAF provides a range of information on the economic, health, and social characteristics of children, adults, and their families and contains information on over 44,000 households and 34,439 children. The NSAF has several strengths that make it ideal for carrying out this investigation. First, it contains a very large number of children living apart from their biological father, roughly 10,000. Second, the NSAF contains an oversample of disadvantaged families with incomes below 200 percent of the Federal poverty level, a group that is more likely to be food insecure. Third, the NSAF includes questions related to food insecurity and information about children's social and financial involvement with nonresident parents. With few exceptions, this combination of variables is not found in recent nationally representative samples of U.S. families with children.

All analyses are in reference to low-income children and their families. The analytic sample is comprised of 7,861 focal children ages 0-17 who live with their biological (or adopted) mother and whose biological (or adopted) father is absent from the home. Additionally, the study sample is limited to families with incomes below 200 percent of poverty, which is slightly above the level necessary to qualify for most food assistance programs.

The NSAF food insecurity questions focus on the respondent's and their family's food situation over the last 12 months. Questions include (1) worrying whether food would run out before getting money to buy more, (2) food not lasting and not having money to get any more, and (3) adults in the family ever cutting the size of meals or skipping meals because they did not have enough money for food, and the frequency with which this happened. First, the study treats each response as an independent indicator of food insecurity and measures frequency dichotomously (ever true or ever happened versus never true or never happened). The study also assesses the severity of food insecurity by using three indicators to create three new dichotomous variables: (1) ever experienced at least one of the above aspects of food insecurity, (2) ever experienced at least two of the above aspects of food insecurity, and (3) ever experienced all three food insecurity indicators.

The study estimates a probit model of the form:

$$\text{FOODINS} = \alpha \mathbf{FI} + \beta \mathbf{X}_1 + \mu$$

where FOODINS is an indicator of whether the household experienced this aspect of food insecurity (=1) or not (=0). Experiencing an aspect of food insecurity is a function of father involvement (vector **FI**) as measured through child visitation and the payment of child support. **X** is a vector of other explanatory variables, and μ is an error term.

The characteristics of the analytic sample reflect our focus on families with incomes below 200 percent of poverty. A majority of these families have problems meeting their food needs. For example, 57 percent reported that, in the last 12 months, they worried that their food would run out before getting money to buy more. One-half of the families experienced an instance where their food did not last and they did not have money to get more, while one in three (32 percent) households reported that adults had to cut the size of their meals or skip meals because they did not have enough food. Overall, nearly two-thirds (62 percent) of the families in the sample experienced at least one of these three food problems in the previous year, one-half (49 percent) experienced at least two of these food problems in the previous year, and one-quarter (26 percent) experienced all three of these problems.

Study results show that frequent—more than once a week—visits by the father reduce the likelihood that the focal child's resident family will experience episodes of food insecurity. This result is robust in that it is found for each of the three separate food insecurity measures and for the severity measures. Furthermore, while any amount of visiting is typically found to be negatively related to aspects of food insecurity, the relationship is statistically significant only for visiting more than once a week, the most frequent level of visitation measured.

Receiving child support does not have the same consistent significantly negative effect on food insecurity that visits by the father do. With respect to each individual indicator of food insecurity, receiving child support reduces only the likelihood that the adults in the resident family's household ever had to cut the size of their meals or had to skip meals. Only this relationship is statistically significant. The study hypothesizes that the small amount of child support received by families who receive it are not sufficient or consistent enough to affect their ability to access an adequate amount of food regularly. Even with additional child support income, these low-income families continue to worry about having enough food and to experience times when they do not have enough food for everyone to eat.

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Factors Influencing Childhood Obesity

Effects of Mother's Employment in Early Childhood on the Risk of Overweight in Adolescence: Regional Comparisons

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Obesity among children and youth has become a nationwide concern because of its wide prevalence and rapid rate of increase in recent years. Further, not only is the proportion of overweight children rising but also those who are overweight are heavier than 30 years ago. Some researchers attribute these developments to an increasing share of meals eaten away from home due largely to a rapid rise in the number of fast food restaurants. Children today live in an environment where the fast food industry is expanding, making unhealthy food more easily accessed than in the past.

Despite societywide changes in the availability of healthy versus unhealthy food, children are at risk of becoming overweight because of other social, household, or individual characteristics that determine their exposure to such food. In this study, mother's employment was hypothesized to be a key factor influencing a child's odds of becoming overweight because of the limited time to prepare meals at home and the increased consumption of meals away from home. Specifically, the study examined whether a mother's employment during early childhood predicts a child's chance of becoming overweight in adolescence. While the amount of fast food that children ate is not directly measured in this study, the link between maternal employment and overweight in their children provides a clue to the detrimental impact of the food purchased or cooked outside of home. This linkage is presumably more commonly observed in households where mothers have limited time. More importantly, findings may provide a point of intervention in the obesity epidemic among children.

This study used data from the National Longitudinal Surveys of Youth 1979 (NLSY79) and from the NLSY79 Children and Young Adults. The study estimated whether the average number of hours mothers worked per week during their children's early childhood (measured at 4 years old) affected the children's chances of becoming overweight in adolescence (measured at either 15 or 16). To assess geographic variations in this association, a multivariate logistic regression model was estimated for each of four U.S. regions: Northeast, North Central, South, and West. An indepth analysis was conducted for only the South because it has the highest prevalence of overweight children. The total sample included 1,874 children (777 for the South) born between 1979 and 1985, overrepresenting racial minority and economically disadvantaged groups.

Control variables used in logistic regression models included hours the mother worked during her child's adolescence, mother's body mass index (BMI), whether the mother was a teenager when the child was born, whether the mother was single in the child's early childhood, years of education the mother completed by the time her child became an adolescent, sex and race of the child, household income, and urban residence.

Contrary to the study's hypothesis, results suggest that in only the Northeast did the longer hours a mother worked significantly predict reduced odds of children becoming overweight, controlling for the full set of variables. No such significant impact of hours worked was found in other regions. Specifically for the South, when only two variables were used in the model (i.e., hours mothers worked when the child was 4 years old or an adolescent), the more hours a mother worked when her child was 4, the lower the odds of the child becoming overweight. However, this initial association disappeared when the mother's BMI and education were controlled. Thus, the more hours a mother worked reduces the odds of young children becoming overweight over time, but this link appears to be explained by the mother's BMI and education.

These findings do not support the notion that the more hours a mother works during her child's early childhood the greater the chance the child has of becoming overweight. In contrast, the benefits of having a working mother may extend beyond the quality of meals they make available to children. Young mothers who maintain a stable work environment are possibly less likely to be overweight themselves and more educated. Furthermore, their ability to work while raising young children may imply a variety of other characteristics not considered in this study that promote child health, such as good local economy, assistance from spouse, extended family or neighbors, flexible work schedules, high household income, good time-management skills, and so on. Further research on parental characteristics implicated in childhood obesity may focus on pathways by which a mother's high BMI is related to an increase in obesity in children beyond the effect of biological makeup or how a mother's education protects children from unhealthy weight gains.

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The Relationship of Child Body Mass Index to Parental Child Feeding Practices, Weight Perceptions, and Personal Eating Behaviors Among 3-5-Year-Olds Attending Head Start

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The prevalence of overweight and obesity in the United States continues to increase for both adults and children. Prevalence of childhood overweight has increased in all sociodemographic groups; however, disparities do exist. Particularly at risk for childhood overweight are African-American girls, Hispanic girls and boys, and children from low-income households. Many factors contribute to the development of overweight in children; however, recent literature suggests several factors that need further exploration, including parents' child feeding practices, parents' perceptions of children's weight status, and parents' personal eating behaviors. Previous studies addressing these factors have included primarily Caucasian and middle to upper income participants. This study adds to the existing literature by including participants from a low-income, primarily African-American population.

Three primary objectives of the current research were to determine (1) the accuracy of parents' perceptions of their children's weight status, (2) the relationship of parents' child feeding practices to their children's weight status, and (3) the relationships among parents' personal eating behaviors, their child feeding practices, and their children's weight status. A cross-sectional descriptive study design was used to address each of the research objectives.

Participants were recruited and data collected during the fall 2004 orientation session held for parents of children attending Head Start centers in one south Mississippi county. Parents and/or caregivers of children completed surveys assessing their child feeding practices (as measured by the Child Feeding Questionnaire), perceptions of their children's weight status (assessed with culturally appropriate body image silhouettes developed for this study), and personal dietary behaviors (as measured by the Three Factor Eating Questionnaire). Children's measured height and weight were obtained from Head Start records, and their weight status was classified as underweight, normal weight, at risk of overweight, or overweight based on current Centers for Disease Control and Prevention criteria. The final sample used for analyses in this study included 281 mother/child pairs. Statistical analyses included Chi-Square, Spearman correlations, multivariate analysis of covariance, and regression analyses.

One of the most important findings in this study was the significant degree of misclassification of children's weight status by their mothers. Results clearly suggested that mothers' perceptions of their children's weight status did not correspond with the definitions of weight status in children established by the scientific and medical communities. These discrepancies may partly reflect cultural differences with respect to acceptable or desirable body size, an idea supported by the large number of mothers in this study only recognizing the largest figures in a body image silhouette scale as depicting an overweight child. These results suggest the need for educational interventions that emphasize the potential health consequences of children's body mass index-for-age percentiles, while respecting

and working within the context of cultural body size preferences. A focus on accurate perceptions of children's weight status by mothers for the sake of health is warranted, with an emphasis on promoting healthy eating behaviors in all children, regardless of their body sizes.

Other results demonstrated that mothers' child feeding practices differed with respect to their children's weight status. However, results varied depending on whether the statistical analyses were based on children's actual weight status or mothers' perceptions of their children's weight status. The variation becomes a concern when the large degree of children's weight misclassification by these mothers is taken into account. Further, results from the study suggest that promoting dietary restriction may not be an appropriate focus in efforts to prevent overweight, as mothers of overweight children (based on actual weight status) reported a significantly greater degree of restriction of their children's food intake when compared with mothers of underweight children or mothers of children classified as at risk of overweight.

Head Start is in a unique position to stem the upward trend in childhood obesity through its mandated nutrition services and education for children and their families. Head Start programs often emphasize building quality parent-child relationships. Results of this study suggest that, within this context, addressing aspects of parent-child feeding relationships is also important, although additional research is needed to further clarify the role of mothers' child feeding practices in the development of overweight in low-income, primarily minority children.

The cross-sectional nature of this study only allows the identification of relationships among factors rather than the establishment of cause and effect. Mothers' child feeding practices may be in response to children's weight status, rather than predicting children's weight status. However, this study is an important starting point in that the results may inform other larger and longitudinal studies related to the role that maternal perceptions and behaviors may play in development of childhood overweight in similar populations.

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Prevalence and Predictors of Child Obesity in North Carolina: Implications for Head Start Programs

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Obesity has become a disease of epidemic proportion having profound negative health, psychological, and social consequences for both children and adults in the United States. Obesity is a major risk factor for four of the six leading causes of death in the country, including coronary heart disease, certain types of cancer, stroke, and Type II diabetes. Psychological, social, emotional, and health problems resulting from obesity in children can continue into adulthood. Unfortunately, few studies have been undertaken on childhood obesity, especially for children ages 6 and younger.

The purpose of this study was to assess the prevalence of overweight and obesity among Head Start children ages 3-4 in North Carolina and to identify factors contributing to obesity among this group. The specific objectives were to (1) assess the dietary habits and intake of the children, (2) assess their exercise and lifestyle habits, (3) determine their parents' perceptions and attitudes regarding obesity, (4) assess parental knowledge of nutrition, and (5) determine predictors of child obesity, such as dietary intake, exercise habits, and parents' nutrition knowledge and attitude toward nutrition and obesity.

The setting of the study in North Carolina is particularly important given that children in this State have been found to be less flexible, have greater body fat, and have poorer fitness than youth nationwide. In fact, youth in North Carolina are more likely to be obese than other children in the Nation as a whole.

One Head Start center in North Carolina, with 4 satellite locations, selected for this study provided height and weight data for 244 children ages 3-4. A survey questionnaire was administered to the parents who agreed to participate in the study. The survey instrument contained questions on the demographic profile of their children, their children's dietary habits, lifestyle/exercise habits, and food intake. In addition, parents were asked a series of questions designed to capture their views on food intake issues, their attitudes/perceptions/knowledge of nutrition, and their demographic characteristics. Finally, parents were asked to maintain a 5-day log of their children's dietary intake, TV watching, and exercise regimen. Pre- and post-test instruments were used to assess the effect of nutrition knowledge and attitudes by parents before and after completion of a nutrition education intervention program.

Of the 244 children whose weight and height were obtained and body mass index (BMI) calculated, about 25 percent were overweight (at or above the 95th percentile), 19 percent were at risk for being overweight (85th-94th percentile), 48 percent were in the healthy range, and 8 percent were underweight. These figures tend to be higher than a 2003 national study that involved children ages 2-4.

Some 147 parents of the 244 children whose weights and heights were obtained returned their questionnaires. However, only 109 of these surveys were sufficiently complete for use in this study. Over one-half of their children involved in the Head Start program were 4 years old, while the others were 3 years old. Nearly 75 percent of the children were African-American, while some 26 percent were of Hispanic background. Over 28 percent of the 109 children whose parents completed the surveys were classified as overweight. Two-thirds of the overweight children were African-American.

Results of the survey showed that a majority of the children were afraid to try new foods, regularly ate breakfast, and had good appetites. Nearly 60 percent of the parents stated that their children often ate fruits and vegetables (perhaps as a result of foods eaten while attending the Head Start program). About 48 percent of the parents allowed their children to choose their snacks when shopping for food, an item that had a strong correlation with the BMI of these children.

As for the frequency of food intake, three of every five parents indicated that their children often or always consumed whole milk, regular cheese, and processed meats. Nearly one-half noted that their children always or sometimes ate deep fried and breaded foods. Statistical analyses of the dietary intake of children revealed that the type of food and frequency consumed was significantly correlated with children's BMI, especially consumption of desserts, foods containing rich sauces and gravies, salted nuts, chips, and doughnuts.

When the focus of the study shifted to parents' attitudes toward nutrition, about one-half of the parents indicated that they often made children finish the food on their plates, offered them dessert as a way to make them finish the food on their plates, or removed privileges from their children if they felt they did not eat enough at mealtimes. These attitudes had a positive correlation on the BMI of their children. Parents were then asked to respond to 11 nutritional-knowledge multiple-choice questions. The percentage of correct responses ranged from a low of 25 percent to a high of 71 percent.

In order to assess the diversity of factors that might influence the BMI of Head Start children in the study, a multiple regression model was developed that contained eight key independent variables (children's dietary habits, food intake, exercise habits, and family weight status and parents' BMI, exercise habits, attitudes towards nutrition, and nutritional knowledge). The results suggested that few of the variables proved significant and that the explained variance was very low.

The results of the study offer some inkling of the factors that place young children at risk with regard to their weight. The small sample of Head Start children ages 3-4 revealed that many are already showing symptoms of being overweight. Parents play a critical role in determining the type of food their children eat and the frequency with which they eat it. But, the study shows that parents had poor nutritional knowledge and contributed to their children's weight problems by allowing them to choose foods when shopping (many which have limited nutritional value) and feeding them foods that were high in fats and calories.

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Assessing the Association Among Food Insecurity, Child Feeding Practices, and Obesity in Low-Income Latino Families

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Overweight and obesity across nearly all age levels are of increasing concern in the United States because of the emergence of obesity at earlier childhood ages and the negative implications for later adult body composition and health. Recent research has suggested that food insecurity may actually play a role in the onset of obesity among some low-income groups. Although the evidence is not yet conclusive, the results of several lines of current research are consistent with causal associations between food insecurity and obesity. One line of inquiry is to examine food insecurity in relation to child feeding and rearing practices that may facilitate child overweight.

This study assessed the impact of maternal food insecurity, both past and current, on child feeding practices that encourage weight gain among children in low-income families enrolled in the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC). Knowledge gained about factors influencing child feeding practices is relevant to WIC nutrition educators, who are responsible for educating mothers about effective child feeding strategies.

Three research questions guided the study:

1. Are mothers who are currently experiencing food insecurity or who have experienced food insecurity in the past more likely than other mothers to (a) be indulgent with respect to feeding their child, (b) practice controlling/restrictive feeding practices, (c) use food as a reward, or (d) offer their children larger portion sizes?
2. Are mothers who are overweight or obese more likely to engage in these child feeding practices?
3. Are mothers who engage in these child feeding practices more likely to have overweight children or children at risk for overweight?

The pilot study examined the possible influence of past and current food insecurity on child feeding practices and prevalence of childhood overweight. Rates of child overweight in this pilot study population exceeded the national norms for low-income Hispanic children ages 2-5 by more than 100 percent (40 percent versus 17 percent). However, this convenience sample of WIC-eligible urban and rural mothers of children ages 2-5 is not representative of either California or urban and rural low-income Latino populations.

Among Latino immigrants, such as many in this group of young Mexican-American mothers, acculturation to U.S. culture is associated with poorer dietary habits, less physical activity, and higher rates of obesity than preacculturation. With higher levels of acculturation and subsequent generations in the United States, Latinos tend to increase consumption of fast food, convenience foods, salty snacks, simple sugars, chocolate candy, and total, added, and saturated fats. Because the habits of children are largely developed and maintained in the home, parent feeding practices were of particular concern for these immigrant families.

In these families, few parenting differences were found between past and current food-insecure mothers. The study's sample size was small, and the study was limited by the multiple tests that were done on the data that could have created some false positive findings. However, trends emerged among mothers who reported experiences with past food insecurity that suggest possible differences in factors associated with obesity. The study observed a tendency for past food-insecure mothers to be less likely to be obese than mothers who had not experienced food insecurity in their childhood. Past food-insecure mothers were less likely to believe that their children should eat all of the food on their plates. They also were more likely to serve their children larger portions of some foods, notably orange juice and corn. In addition, they were less likely to worry that their children ate too much food.

Mothers who reported experiencing food insecurity were not more likely to be obese than food-secure mothers, which is a contrast to other studies showing a significant association between food insecurity and obesity in Latino mothers. A mother who reported currently experiencing food insecurity was less likely to use restrictive child feeding practices and more likely to use food as a reward for her child. Specifically, she was somewhat less likely to keep track of the sweets her child eats and to tell her child that she/he cannot go out to play or watch television until she/he eats. However, these mothers were somewhat more likely to offer their children their favorite foods as a reward for good behavior. At the same time, these mothers were more likely to worry that their children were eating too much food. Accordingly, these mothers had a tendency to be more likely to serve their children smaller portions of higher fat, energy-dense foods, specifically French fries and chicken nuggets. More of these mothers reported that a physician or health professional had told them that their children were overweight (27 percent versus 6 percent for food-secure mothers).

Other research has corroborated that current food insecurity may affect the variety of foods available and consumed by families. Thus, it may be natural for mothers to overfeed their children when food is available while limiting food in times of food insecurity. From this small study, current food insecurity, as compared with past food insecurity, appears to be more associated with certain child feeding practices that are theoretically associated with childhood overweight.

One of the most dramatic findings is the low level of concern for pediatric overweight expressed by the mothers of overweight children. Studies have shown that Latino mothers associate thinness with poor health and being prone to disease. Other studies of food insecurity among Latino immigrants have confirmed the mismatch between childhood overweight and maternal concern. WIC nutrition educators and participants have previously reported that mothers typically disagree with educators' assessments of overweight. In a setting where such a high percentage of children are overweight, mothers may assume that higher weight levels are "normal" weight. Further, mothers may be reluctant to label or believe that their children are overweight. Finally, mothers and parents reportedly give explanations or excuses for their children's weight status, citing that they will "grow out of it" or that overweight is determined by genetics.

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Food Insecurity Among Vulnerable Populations

Household Food Security, Dietary Intake, and Obesity Among a Sample of Recently Arrived Liberian Refugees Receiving Food Assistance

Craig Hadley, University of Michigan

Currently, 10 million individuals in the world meet the United Nation's definition of a refugee—that is, an individual who is unable to return to his or her country of birth because of a well-founded fear of persecution. Refugees are typically individuals forced to flee their homes because of civil wars and are, therefore, exposed to violence, torture, and loss of family and assets. Each year, approximately 70,000 refugees are eligible to be resettled in the United States through the U.S. Department of State's refugee resettlement program.

Most research on refugees who have resettled in western countries has focused on physical or mental health status at the time of entry. Studies focusing on other dimensions of health and well-being in the post-resettlement period are, however, lacking, which is unfortunate because many believe that resettled refugees may face barriers to entry into the health care system, quality housing, and quality dietary intake.

This study investigated several dimensions of health and well-being among a sample of West African refugees living in a medium-sized city in the Northeastern United States. The study focused on the social and economic determinants of household food insecurity.

Food insecurity occurs whenever adequate and safe foods are not available or the ability to acquire such foods is limited or uncertain. Conceptually, food insecurity is a more direct measure of inadequate or unreliable dietary supply than is low income because food insecurity more closely taps into the phenomena of interest. Food insecurity represents a public health concern and is a useful index of health and well-being because it is associated with poverty, ill health, poor dietary intake (e.g., low intake of fruits and vegetables), limited social capital, depressive disorders, and, paradoxically, overweight and obesity among females. Refugees resettled from developing countries are hypothesized to be at elevated risk of food insecurity because they initially face high levels of underemployment or unemployment, language barriers, shopping difficulties, and a tremendous shift in the budget and management of household resources. The study's objective was to test for associations between measures of food insecurity and indicators of economic standing, knowledge, and practice of budget management strategies and measures of acculturation, including language ability and time since arrival.

A variety of ethnographic and survey methods were employed in this study. For the survey, a nonprobability sample was used and 101 West African caretaker-child pairs were enrolled (there were no refusals). At baseline, mean household size was five individuals, one to two of whom were under the age of 5. Caretakers were on average 30 years of age, with a range of ages 18-74. The women had been in the United States for an average of 22 months. Just over one-half of the women (59 percent) interviewed had a high school education or higher, and 57 percent were currently

employed. One-half of caretakers reported the mean household income as less than $1,000 per month, and 64 percent reported their own income as less than $1,000 per month. Nearly all caretakers had participated in the Food Stamp Program (FSP) at some point since their arrival (98 percent), and about 48 percent were currently participants.

About 53 percent of caretakers' responses indicated that they and members of their households had experienced periods of food insecurity during the 6 months before the interview. The 53 percent was comprised of 37 percent who experienced food insecurity with no indication of hunger and 16 percent whose responses to the USDA food insecurity scale indicated food insecurity with hunger. The mean food insecurity score on the continuous scale, indicating severity, was 3.6. The modified USDA scale showed acceptable internal consistency. A majority of caretakers (90 percent) responded that they had experienced food insecurity before arriving in the United States.

In bivariate statistical tests, the occurrence and severity of food insecurity was associated with both economic and sociocultural factors. Households that scored lower on several measures of financial security scored significantly higher on the food insecurity scale. Similarly, respondents who were currently participating in the FSP experienced greater food insecurity. Informal social support appeared to be protective against food insecurity, although the effect was weak. Two measures of acculturation, language use and shopping difficulty, were also associated with greater food insecurity. Respondents who reported difficulty with understanding people and who reported more difficulty shopping scored higher on the food insecurity scale. These bivariate relationships disappeared in a multivariate regression model when the time since arrival in the United States was entered as a factor. This commonly used measure of acculturation was the most important explanatory variable in this study and explained approximately 13 percent of the variation in food insecurity.

Other noteworthy results include:

- The prevalence of overweight and obesity among caretakers approached 65 percent, which appears to be considerably higher than found in the sending population.
- Participation in the FSP declined sharply with amount of time lived in the United States.
- The share of the sample that reported being employed increased sharply with time in the United States.

Although based on a nonprobability sample, findings suggest that food insecurity is an important public health problem in this vulnerable population, particularly during the first year in the United States. The distribution of food insecurity is consistent with theoretically derived predictions and ethnographic reports from caseworkers and refugees. The results also highlight the important role that economics and acculturation appear to play in protecting against food insecurity. Confidence in the results is further enhanced by the concordance between these findings and the limited data from other groups resettled in other industrial countries. From a programmatic standpoint, the results suggest that traditional measures of

self-sufficiency, such as employment, may not be reliable indicators alone. Rather, measures of income, coupled with measures of food insecurity, may provide a more accurate picture of the health and well-being of a family. Despite agency objectives of achieving self-sufficiency within the first 6 months, these data suggest that families may still be struggling 2 or 3 years after resettlement.

The prevalence and existence of food insecurity, as identified through qualitative and quantitative methodologies, also suggest that nutrition education programs should be further integrated into the resettlement orientation that all refugees are expected to undergo upon arrival in their new home. The Expanded Food and Nutrition Education Program (EFNEP), through its hands-on didactic approach, may be a useful program to promote money management strategies to ensure that food stamps reach through the whole month. The EFNEP, along with education geared towards dietary change, may improve food insecurity as well as intake of key micronutrients; the latter may be particularly important given high levels of iron deficiency anemia in sending countries. The data on overweight and obesity from this refugee sample also suggest worrisome trends that may be combated through behavioral change programs in the area of physical activity and dietary intake.

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Local-Level Predictors of Household Food Insecurity

Judi Bartfeld and Lingling Wang, University of Wisconsin, Madison

Household food security—the assured access of all people to enough food for a healthy and active life—has received considerable attention from policymakers and researchers over the past decade. The prevalence of food insecurity varies substantially across States, with most of this variability accounted for by differences in the demographic composition of States as well as differences in their economic and policy contexts. Although research has made considerable headway in understanding cross-State food security patterns, there is little empirical evidence about how food security varies within States or about the factors that may contribute to such variation.

This analysis uses new data from the Wisconsin Schools Food Security Survey, a self-administered survey designed to measure food security among households with elementary school children. The report provides findings from a study that examined the relationship between both household and contextual characteristics and food security among households with elementary school children in Wisconsin. Food security is measured with the standard six-item version of the food security scale. Data were collected in several waves beginning in spring 2003, with the final year of data collected as part of the current project. A variety of contextual variables at the school, Zip Code, and county levels were appended to the data.

This study conceptualizes food insecurity not merely as an indicator of economic hardship but rather as the result of a more complex interplay among personal resources, public resources, and the economic and social contexts in which a household resides. The report focuses on several components of the food security infrastructure, including housing, transportation, food outlets, nutrition assistance programs, and local labor markets. Key findings include the following:

- The demographic factors that predict food insecurity—including low income, renting versus owning a home, larger household size, less than college education, and no employed people in the household—are consistent with established findings, providing evidence of the validity of the self-administered scale as a measure of the underlying food security construct.
- Housing costs play a significant role in contributing to food insecurity. Results imply that each $100 increase in median rent is associated with a 13-percent increase in the odds of food insecurity.
- Access to transportation—including both private vehicles and public transportation—significantly reduces the risk of food insecurity.
- Households with greater proximity to grocery stores or supermarkets have less risk of food insecurity. Results indicate that each additional mile from a supermarket or grocery store increases the odds of food insecurity by 2 percent.
- Local labor markets also play a role. The odds of food insecurity increase by an estimated 4 percent for each percentage-point increase in the county unemployment rate.

- Households in urban areas have significantly greater risk of food insecurity.
- No specific evidence was found that more widely available nutrition assistance programs—including the School Breakfast Program, the National School Lunch Program, and the Food Stamp Program—have measurable impacts on food security, though the study emphasizes the difficulty in adequately controlling for the role of self-selection.

An important implication of this research is that even communities that have not collected local food security data can make informed assessments of whether they are at higher or lower risk, based on local demographics and local characteristics. Furthermore, the overall finding—that an array of local attributes, which are at least partially subject to local influence, plays a role in food security—implies that communities interested in promoting food security have a variety of avenues worth pursuing. Strategies implied by this research include efforts to promote affordable housing, to increase access to public and private transportation, and to increase the availability of grocery stores and supermarkets. Important future directions include efforts to understand the roots of the rural-urban food security differential and efforts to identify the role of participation in nutrition assistance programs while accounting for the bias introduced by self-selection.

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Measuring the Extent and Depth of Food Insecurity: An Application to American Indians in the United States

Craig Gundersen, Iowa State University

Within the extensive literature on food insecurity in the United States, little work has been done on (1) the depth and severity of food insecurity (as opposed to just the food insecurity rate) and (2) the food insecurity status of American Indians. This study addresses both of these topics. To measure food insecurity, three axiomatically derived measures of food insecurity are used—the food insecurity rate, the food insecurity gap, and the squared food insecurity gap. As expected, given that economic conditions are worse for American Indians than for the rest of the population, food insecurity levels are generally higher for American Indians than for the rest of the population. However, the magnitude and significance of these differences differ depending on the choice of food insecurity measure. If, instead, only the food insecurity rate had been analyzed, the picture of food insecurity among American Indians compared with the rest of the population would be markedly different. Even after controlling for other factors in multivariate frameworks, the comparisons between American Indians and the rest of the population remain.

The study used data from the 2001, 2002, and 2003 Current Population Survey (CPS), which surveys about 50,000 households monthly and includes the Core Food Security Module (CFSM). Within the CFSM, a household with children responding affirmatively to three or more questions is deemed food insecure, and a household responding affirmatively to eight or more questions is deemed food insecure with hunger. Affirmative responses, then, are designated as a food security index. The CFSM contains 18 questions pertaining to a household's inability to meet basic food needs due to financial constraints; for households without children, only 10 of the 18 questions are answered. Sample questions include: "Did you or the other adults in your household ever cut the size of your meals or skip meals because there wasn't enough money for food," or "Did a child in the household ever not eat for a full day because you couldn't afford enough food."

Methodology included conversion of the CFSM affirmative responses to a relevant value—that is, the food insecurity indicator. The Rasch scoring method was used, which assumes that the probability of a household answering a question positively or negatively follows a logistic distribution. Using a maximum likelihood estimation based on the overall response pattern of households to all questions, the Rasch score for each was derived.

The study found that across all three measures for the all-income sample (food insecurity rate, food insecurity gap, and squared food insecurity gap), food insecurity is higher among American Indians with children than among the rest of the population with children and the differences are statistically significant. For the low-income sample, the difference between American Indians and the rest of the population is significant for the food insecurity rate but not for the other two measures. For households without children in the all-income and low-income samples, American Indians have higher food insecurity rates than do the rest of the population. In contrast to the food insecurity results, the study found no statistical distinction between food insecurity with hunger between American Indians

and the rest of the population among households with children. In both the all-income and low-income samples of households without children, American Indians have higher food insecurity with hunger than do the rest of the population across all three measures.

In general, American Indians have higher levels of food insecurity than do the rest of the population, but this conclusion depends on the choice of measure and choice of sample. The magnitude of the differences depends on the choice of measure. These differences carry over to multivariate considerations of differences between American Indians and the rest of the population. Along with negative consequences from limited economic opportunities, including high rates of obesity, diabetes, tooth decay, and low breastfeeding rates, the study concludes that American Indians also face higher levels of food insecurity, and these levels are especially prominent in households without children.

The study suggests that further research is needed. Many other groups, such as single parents with children, have higher than average food insecurity rates, and a richer theoretical framework might be used with this population. This study's analysis used the CPS, but a wide array of other data sets exist that have the CFSM, and this study's theoretical framework could be used with those as well. Also, numerous other income poverty measures may be valid to employ as food insecurity measures. Finally, the study recommends that on-reservation versus off-reservation residence may make a difference in food insecurity. CPS does not track residence because of confidentiality, so other available data sets, in conjunction with CPS, may allow for answers to this issue.

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Dynamics of Material Hardship in the Women's Employment Study

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An abundance of literature examines the dynamics of poverty, but little research exists on the dynamics of material hardship. Within a welfare sample, this study analyzes common experiences of material hardship over time, identifies material hardships that are more prevalent, and examines if women experience multiple hardships.

Data come from five waves of the Women's Employment Study, a stratified random sample of welfare recipients from one Michigan urban county in February 1997. The data measure six different forms of material hardship: food insufficiency, telephone disconnection, utility disconnection, unmet medical needs, improper winter clothing, and housing problems.

Findings suggest that, while cross-sectional reports of material hardship are comparable to those reported in past studies, the number of respondents who reported ever experiencing each form of hardship is substantially higher. Unmet medical needs, reported by 56 percent of the respondents, and telephone disconnection are the most frequently indicated forms of material hardship. Reports of food insufficiency and housing problems follow closely. Improper winter clothing, experienced by 20 percent of the respondents, and utility disconnection are the least commonly reported hardships.

Results also suggest that respondents are likely to experience multiple forms of hardship over the observation period. This finding perhaps indicates that the overall quality of life within these households is quite low at some point (or points) during the transition from welfare to work. In fact, only 1 in 10 respondents reported that their household never experienced any material hardship over the 5-year observation period. On average, respondents reported 2.58 types of material hardship. Across all types of hardship, respondents report an average of 4.41 hardships.

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Community Context of Food Assistance and Dietary Choices

Summary of the Validation Study of a Diet Adequacy Screening Tool for Participants in the Older Americans' Act Nutrition Program

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The Older Americans Act (OAA), enacted in 1965, and since reauthorized 14 times, established the Administration on Aging (AoA). The goals of the OAA are to provide services to older individuals with the greatest economic and social need, especially to low-income minorities and residents of rural areas. The AoA funds a network of State units on aging and area agencies on aging (AAA) to coordinate a comprehensive array of home and community-based services to people ages 60 and older that enable them to remain in their own homes.

Together, the congregate and home-delivered meals programs constitute the largest share of funding for any service under Title III of the Older Americans Act. AAAs administer the nutrition program and contract with providers to prepare and deliver the meals. Sites for the congregate meals program include senior centers, schools, and senior housing facilities.

The purpose of this study was to validate a Diet Screening tool developed by representatives of State and area agencies on aging that participated in the Performance Outcomes Measures Project (POMP) under the auspices of AoA. The starting point was the nutrition screening initiative (NSI), which the network uses for administrative reporting to AoA. POMP grantees modified the NSI to more accurately reflect areas over which the network had some influence. The questions on the Diet Screener expanded the NSI by asking clients to report the number of servings of foods they usually eat in a day in each major food group and by omitting questions on alcohol consumption, over-the-counter and prescription drugs, and dental problems that interfered with eating.

The study served to evaluate a diet adequacy scoring system developed in POMP to measure the impact of the nutrition program. The adequacy score assigns the client to one of three categories: "Adequate" (≥17), "Marginal" (16-11), and "Poor" (<11) diet. The score measures the participants' food intake against USDA's Food Guide Pyramid, published with the Dietary Guidelines for Americans, 2000.

To evaluate the validity of the POMP Diet Screener, which asks about food behavior and usual intake for seven foods and food groups, the study compared it with the Diet History Questionnaire (DHQ), a food frequency questionnaire (FFQ) developed and validated by the National Cancer Institute (NCI). The DHQ asks about usual intake over the past year for more than 130 foods.

Congregate meals clients who had completed the Diet Screener were recruited in South Bend, IN, and Montgomery County, MD, to participate in the validation study. Approximately 1 month later an interviewer administered the food frequency questionnaire by telephone. Data were entered

from the Diet Screener into an Access database, and the FFQ was scanned using a specific diet calculation program. The Diet*CALC software developed by NCI yielded nutrient and food group intake estimates from the DHQ. Analyses included range checks of all data elements to check for possible outliers and the calculation of adequate servings of food groups and Diet Adequacy scores for each participant. The study then compared the adequate serving sizes of the Diet Screener with those of the DHQ, the criterion measure. Finally, the diet adequacy scores obtained from the two methods were compared.

The majority of the participants were White females ages 75 and older living alone with household incomes below $20,000, which is similar to the demographic profile of participants nationwide.

The Diet Screener performed well compared with the DHQ in estimating intakes from the Vegetable and Dairy groups. However, it underreported the number of servings from the fruit category by 31 and 35 percent and grain category by 29-45 percent (males and females, respectively). It also overreported the number of servings of meat/beans for males and females by 30 and 40 percent.

Almost 90 percent of males and females met the “Adequate” standard for number of meals per day using the Diet Screener (this information was not captured on the DHQ). For all food groups except meat/beans, however, fewer participants reported an adequate number of servings using the Diet Screener compared with the DHQ. In addition, while 37 percent of men and more than 23 percent of women reported adequate grain servings on the DHQ, none reported an adequate number of servings on the Diet Screener.

Results suggested that the Diet Screener incorrectly categorized participants downward compared with the DHQ. The screener classified more than 38 percent of males and almost 40 percent of females as having “Poor” diets, whereas the DHQ classified only about 20 percent of males and 23 percent of females into the same category.

The results of this study are in general agreement with earlier findings—the POMP Diet Screener misreports number of servings for most food groups and misclassifies congregate meals clients as having “Poor” diets. These results occurred even though the POMP project area agencies refined the food questions in the NSI to capture dietary intake in more detail (suggesting more accuracy). There are a number of possible explanations for these findings. First, they could be related to people’s perceptions of what they eat. A USDA study found that older respondents overestimated their meat/bean, dairy, fruit, and vegetable intakes and underestimated their grains when using a screener to report intake. Second, they could be associated with problems in measuring diets among the elderly—memory, comprehension, literacy, special diets, and dentition can all contribute to inaccurate reporting. And third, the questionnaire design may have caused respondents to overreport or underreport their foods. The POMP Diet Screener has the potential to be a useful tool for the AoA Nutrition Program to inform the diet adequacy of its clients and measure the impact of the program on their dietary status. The results of this study provide

valuable information for refining this simple tool to measure diet adequacy in an elderly population. Future research needs to be considered that focuses on cognitive and focus group testing to better understand the abilities of the elderly population to complete a self-administered instrument about their diet.

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Improving Community Nutrition Through Traditional Tohono O'odham Foods: A Community-Based Health Intervention Study

Katrina Jagodinsky and Tristan Reader, Tohono O'odham Community Action, and Paul Buseck, Tohono O'odham Community College

Tohono O'odham Community Action (TOCA) is a grassroots organization that works to create sustainability within the Tohono O'odham Nation in areas such as economic development, cultural revitalization, and community food systems. TOCA is working to initiate an individual and family health intervention evaluation and has established a relationship with Head Start and Santa Rosa Boarding School for health intervention education. The Community-Based Health Intervention Study includes projects for Household Clinical Trials, Increased Production and Distribution of Traditional Tohono O'odham Foods, and Increased Education Campaigns for Traditional Tohono O'odham Foods. The Tohono O'odham Reservation is located 60 miles southwest of Tucson, AZ, and spans about 4,600 square miles.

To build the infrastructure for change in food systems on the Tohono O'odham reservation, TOCA has quadrupled production and harvest of traditional foods, such as tepary beans, O'odham peas and squash, cholla (choy-ah) buds, and saguaro fruit and syrup. This supply will assure the availability of traditional foods for clinical trials once they are underway. Food production is expected to continue at the current rate, but in anticipation of increased demand, TOCA is seeking both a long-term lease of farmland and more sophisticated processing equipment for a more productive yield.

These foods will also be distributed at all retail outlets and the only grocery store serving the Tohono O'odham Nation. Traditional foods will also be distributed to the Tohono O'odham Senior Center, the Santa Rosa Boarding School, and the Tohono O'odham Head Start Program. Additionally, educational workshops on food cultivation/harvesting, preparation, and nutrition have been conducted in schools, community centers, and health fairs. Community gardens are maintained at five sites across the reservation. TOCA continues to seek out other marketplaces for traditional foods distribution, even to the gourmet market. The PBS series, "Seasoned with Spirit," will feature the TOCA food label and preparation of O'odham traditional foods. This national exposure will enhance knowledge and awareness of the TOCA food project.

Traditional foods awareness will continue to be a priority for TOCA. The educational programming is gaining success, and steps are being taken to convert it into contract income. Physical fitness programming is being increased as well. The third annual Tohono O'odham Olympic games will be held in fall 2006, and interest and attendance is anticipated to increase from previous years, affording TOCA with an opportunity to reach a larger audience with their nutrition and food education program.

TOCA faced an unanticipated challenge in the high level of tribal concerns regarding health research and anonymity of tribal members. Ten families were to be recruited for a study on the effects of consumption of two servings of traditional foods per day. The study would involve monitoring blood pressure and sugar levels, weight, and personal journal entries. TOCA is currently

negotiating with the Tohono O'odham Executive Office and the University of Arizona to ensure both safeguards against misuse of biological materials and the use of culturally sensitive research and evaluation procedures.

Tohono O'odham food distribution has encountered barriers as well. Federal food programs do not recognize traditional O'odham foods in the health standards or food purchase choices; therefore, institutions must meet Federal guidelines before incorporating these foods, and individuals must make difficult financial choices when deciding on food purchases. Cafeterias on the Tohono O'odham reservation do not yet have the equipment needed for onsite food production, which limits the amount of traditional food that can be prepared and served.

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The Role of Tiendas (Small Latino Grocery Stores) in the Food Purchasing Behavior of Latinos Residing in Central North Carolina

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Obesity is a serious health problem among Latino men and women who have immigrated to the United States. The age-adjusted prevalence of obesity among adult Latinos in the United States is estimated at 28.9 percent for men and 39.7 percent for women. As possible evidence of the impact of U.S. lifestyle and environmental factors, Mexican-American women in the United States have almost twice the obesity rates found in Mexico and other Latin American countries. A growing body of evidence links neighborhood environmental factors with risk for obesity and poor diet quality. For example, poorer and predominantly minority areas house significantly more small grocery stores, which are far less likely to carry healthy food selections than those in a predominantly White neighborhood. In addition, poor neighborhoods tend to have fewer produce markets and natural food stores.

Latino immigrants to the Southeastern United States represent one of the largest and most rapidly growing new immigrant populations. Several factors have driven this significant inmigration, particularly from Mexico: affordable housing, employment opportunities, and family reunification. Changes in the new immigrant demographic profile have been so rapid that few institutions are equipped to adequately serve this population. As a consequence, other forms of support have developed to meet the needs of the Latino immigrant community. In the Southeast, small Latino-oriented grocery stores ("tiendas") have become an important source of food and other products and services for new immigrant Latinos. The growth in the number of tiendas in these counties suggests that they likely influence dietary behavior.

This study represents a three-county examination of the presence of tiendas in the community and their influence on Latino store customers' food purchasing behaviors. From several data sources, 43 tiendas were identified. Data were collected from 37 of these tiendas that were in operation, including unobtrusive store observations, indepth interviews with tienda managers, and interviews with tienda customers.

Data from the store observations revealed that the tiendas varied on the number of food-related services offered. For example, 19 percent of the tiendas had an onsite butcher and offered prepared foods to consume onsite or to take home. Sixteen percent of the tiendas had a candy vending machine available, with tiendas located in the rural community having significantly more candy vending machines than tiendas in the suburban and urban communities. In terms of availability of healthy and unhealthy food products, 63 percent and 68 percent of the tiendas carried a limited supply of fruits and vegetables, respectively, 5 percent of stores sold a lower fat variety of cheese, and 14 percent offered a lower fat variety of milk. Unhealthy food products were also observed, including Mexican candy (all stores), American candy (60 percent), and regular soda (all stores). In terms of location, the majority of the tiendas were located in a residential neighborhood (74 percent), in a strip mall (60 percent), near other convenience stores (51 percent), or near a sit-down restaurant (43 percent) or fast food restaurant (38 percent). Significantly

more tiendas were located near a fast food restaurant in the urban community compared with rural and suburban communities.

Indepth interviews with the managers revealed that 57 percent of the managers were also the owners and a majority (63 percent) lived in the community where the tienda was located. The average number of years the tiendas were in operation and managed by the respondents was 3 years. Most of the tienda managers made purchasing decisions alone or in collaboration with the owner. Merchandise and food products were obtained from local vendors catering to these tiendas, including a number of food distributors from Mexico. Stocking decisions were made based on a visual inspection of shelf inventory, seasonality, and customer requests.

Intercept interviews with 114 adult Latino customers found that the customers visited these tiendas on average twice a week for commonly consumed foods and 85 percent lived in the same community as the tienda. The primary motivators for visiting the tienda were quality of service (68 percent), familiarity of products (62 percent), and proximity to home or work (57 percent). The average amount of money spent on groceries was $120 per week. Food prepared at home was the primary source of dietary intake for breakfast (84 percent), lunch (75 percent), and dinner (94 percent).

Store customers were asked about the types of food products they most commonly purchased at the tienda where the interview was completed. Tortillas, meat, soda, and vegetables were the most common products purchased by the customers, followed by dairy products, fruits, and breads. We examined whether two characteristics of the tienda was associated with customers' purchasing of fruits and vegetables: location of tienda and availability of fruits and vegetables. We found no association between location of the tienda and purchasing of fruits and vegetables. However, we found a strong association between reported purchasing of fruits and vegetable and availability of fruits and vegetables in the tienda.

This study provides a first glimpse at a potential source of influence on Latino's dietary intake at a critical period during the acculturation process. We observed that tiendas offer a variety of products and services that are in demand by new immigrant communities. However, tiendas also influence customers' food purchasing behavior by making healthy and unhealthy food products more accessible. Tiendas serve an important role in the community—as a source of information about community resources, as a place to meet and socialize with similar others, and as a place to purchase commonly consumed foods.

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Factors Associated With Oklahoma Older Americans Act Nutrition Program Participants' Ability To Shop, Cook, and Feed Themselves

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Good nutritional status can improve older adult's health, help them remain independent, and improve their quality of life. In a previous study that evaluated 18,488 congregate and home-delivered meal participants, 66 percent and 86 percent of participants who scored at moderate and high nutritional risk, respectively, answered "yes" to the Nutrition Screening Initiative (NSI) Checklist statement, "I am not always able to shop, cook, and feed myself." Older adults' food intake has been reported to be affected by many factors, such as social interactions, finances, emotional well-being, transportation, and living arrangement. However, literature is limited on the relationship of these factors to older adults' ability to shop, cook, and feed themselves.

The purpose of this study was to evaluate the association of theoretical factors (mobility, social interactions, finances, emotional well-being, transportation, living arrangement, and appliances) with the ability of participants in the Oklahoma Older Americans Act Nutrition Program (OAANP) to shop, cook, and feed themselves. The results of this study will enable the Oklahoma Department of Human Services, Aging Services Division (OKDHS ASD) to target programs and services related to participants' ability to shop, cook, and feed themselves, which could help to reduce participants' nutritional risk and to increase their ability to maintain independence.

Data were collected using a project survey that contained the NSI *Checklist* statement, "I am not always able to shop, cook, and feed myself," and items from the U.S. Administration on Aging (AoA) Performance Outcomes Measures Project (POMP) surveys related to theoretical factors (mobility, social interactions, finances, emotional well-being, transportation, living arrangement, and appliances). All survey items were modified to pose yes/no responses. Volunteer OAANP site managers and outreach workers were contracted to complete the project survey with congregate and home-delivered meal participants by in-person interviews to avoid problems if participants did not understand a survey item or if they had difficulty reading or writing.

Chi-square analyses were used to evaluate differences in participants' reported ability to shop, cook, and feed themselves (SCF response) between type of meal program. Factor analysis with varimax rotation was conducted to determine which survey items loaded into construct factors. Construct factor scores were computed so a lower construct factor score represented lower functionality. T-test procedure was used to evaluate differences in construct factor scores between type of meal program and differences in construct factor scores between participants' SCF response by type of meal program. Logistic regression with backward elimination was conducted to determine which construct factor scores were most strongly associated with participants' SCF response by type of meal program.

The study had 859 OAANP participants volunteer to participate, 477 (56 percent) congregate and 382 (44 percent) home delivered. A significant difference was observed in participants' SCF responses between the types of meal program: 8 percent of congregate meal participants compared with 82 percent of home-delivered meal participants reported that they were unable to shop, cook, and feed themselves. As a result, data are reported by type of meal program.

Construct factors identified from the factor analysis with varimax rotation were defined as "Mobility," "Social Interaction," "Emotional Well-Being," "Living Arrangement," "Financial Security," "Financial Management," and "Appliances." Differences in construct factor scores between types of meal program were observed. Participants receiving home-delivered meals had significantly lower mean "Mobility," "Social Interaction," and "Financial Security" construct factor scores compared with congregate meal participants. Differences in construct factor scores between participants' SCF response by type of meal program were also observed. Participants receiving congregate meals who reported they were not able to shop, cook, and feed themselves had significantly lower mean "Mobility," "Financial Management," and "Financial Security" construct factor scores. Participants receiving home-delivered meals who reported they were not able to shop, cook, and feed themselves had significantly lower mean "Mobility," "Living Arrangement," and "Financial Security" construct factor scores; however, they had significantly higher mean "Social Interaction" construct factor scores.

Best-fit logistic regression models identified construct factor scores most strongly associated with participants' SCF response by type of meal program. For congregate meal participants, the best-fit logistic regression model indicated that lower "Mobility" construct factor scores and lower "Financial Management" construct factor scores were significantly associated with lower SCF responses. For home-delivered meal participants, the best-fit logistic regression indicated that lower "Mobility" construct factor scores and higher "Social Interaction" construct factor scores were significantly associated with lower SCF responses.

Congregate and home-delivered meal participants who reported that they were not always able to shop, cook, and feed themselves had significantly lower "Mobility" construct factor scores. In addition, lower "Mobility" construct factor scores were significantly associated with lower SCF responses in the best-fit logistic regression model for both congregate and home-delivered meal participants. Programs and services to improve these reported problems may include senior driving classes, chore services to improve the interior and exterior home environment to accommodate a disability, and access to assistive technology.

Congregate and home-delivered meal participants who reported that they were not always able to shop, cook, and feed themselves had significantly lower "Financial Security" construct factor scores. Congregate meal participants also had significantly lower "Financial Management" construct factor scores. In addition, lower "Financial Management" construct factor scores were significantly associated with lower SCF responses in the best-fit logistic model for congregate meal participants. These financial security issues may indicate a need for financial management classes to address preparing and

purchasing nutritious meals on a budget, making food dollars stretch, applying for additional food assistance programs, applying for discount prescription cards, applying for a reverse home mortgage, asking utility companies to average bills or reassess the due date, and accessing free or reduced-cost public transportation in order to improve financial security.

Although home-delivered meal participants as a whole had lower “Social Interaction” construct factor scores than congregate meal participants, home-delivered meal participants who reported that they were not always able to shop, cook, or feed themselves had significantly higher “Social Interaction” construct factor scores. Additionally, higher “Social Interaction” construct factor scores were significantly associated with lower SCF responses in the best-fit logistic regression model for home-delivered meal participants. This observation may indicate that home-delivered meal participants who lived alone and were not always able to shop, cook, and feed themselves found it necessary to establish greater social interaction in order to overcome their inability to shop, cook, and feed themselves. Note that home-delivered meal participants often receive other services outside of the meal program and that these services probably provide additional social interaction.

The association of social interaction with participants' ability to shop, cook, and feed themselves may indicate a need to provide programs that address establishing social networks for both home-delivered meal participants and the community as a whole. In addition, it may be important to include the network of informal caregivers of home-delivered meal participants in educational programs. Informal caregivers are responsible for providing a substantial amount of care for older adults that support good nutrition, including shopping, cooking, and feeding. Education for informal caregivers related to promoting good nutrition is needed. Many informal caregivers lack the information and skills in providing encouragement to eat, modifying food consistency, or using nutritional supplements.

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