

***Obesity, Poverty, and  
Participation in Nutrition  
Assistance Programs***





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## ***Obesity, Poverty, and Participation in Nutrition Assistance Programs***

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## EXECUTIVE SUMMARY

In September 2003, the U. S. Department of Agriculture (USDA) Food and Nutrition Service (FNS) contracted with ALTA Systems to conduct a project with the goal of providing a comprehensive overview of the relationship between poverty, program participation and obesity by conducting an in depth literature review; and convening an expert panel. The project goals were to (1) Critically review existing studies and other literature to determine if there is a sound empirical basis for identifying a relationship among poverty, participation in food assistance programs, and overweight/obesity; (2) If the existing research was not found to be conclusive, identify what research approaches, including data sources, would be necessary and feasible to fill the knowledge gaps.

FNS provides food assistance benefits through 15 programs. This network of programs plays an important role in providing a nutrition safety net that ensures low-income American families have access to a healthy and nutritious diet. Many low-income individuals are both obese and participants in one or more of FNS' food assistance programs. This project focused on the four largest food assistance programs. These four programs accounted for approximately 90% of FNS' food assistance expenditures in FY2003.

- **Food Stamp Program (FSP):** Benefits across the country are tied to the cost of a low-cost nutritious diet sufficient to sustain an active, healthy life.
- **Special Supplemental Nutrition Program for Women, Infants and Children (WIC):** Food packages are tailored to specific nutrition requirements.
- **National School Lunch Program (NSLP) and the School Breakfast Program (SBP):** Set nutrition standards for school meals served to America's children.

A panel of experts was convened in Washington DC on March 2<sup>nd</sup> and 3<sup>rd</sup>, 2004. The panel represented a cross section of individuals with demonstrated expertise in areas of research design and development, social research methodology, nutrition, obesity, food assistance programs, food insecurity and poverty. The meeting provided a forum for critical assessment of the research literature as well as a discussion of issues related to poverty, food assistance program participation, and overweight/obesity. The panel was tasked to develop a consensus statement addressing the two major objectives of the project. Using the literature review as a starting point for discussion, the panel assessed the methodological strengths and limitations of current research findings.

A rigorous review of the research literature was conducted to identify relevant information pertaining to the relationship among poverty, participation in food assistance programs and overweight/obesity. A major criterion for the research studies was that they considered FNS program participation in their examination of the relationship (including existence and direction of causality) between overweight and/or obesity and poverty. The panel proposed that the relationship between poverty (as measured by multiple socioeconomic factors) and overweight/obesity was a critical issue that must be explored before addressing the impact of program participation. Therefore, research literature germane to that issue was included for discussion as it provided important contextual information and background for the panel discussions. Additional studies suggested by panel members related to issues such as food insecurity, dietary intake and food environment were also included in the reference base.

The research studies selected were abstracted and organized by category. An evidence-based matrix was constructed to facilitate comparison of strengths and weaknesses of the research design as well as to provide a brief overview of the content. The panel identified twelve research studies, eleven published in peer-reviewed journals that met enough of the criteria to merit further discussion during the panel's meeting. Based on the identified research, their individual professional and academic research experience and their focused discussions, the panelists were asked to address the following questions during the panel discussions:

**Question 1:** Does a sound empirical basis exist for determining the relationship among overweight/obesity, poverty, and participation in the four major FNS food assistance programs—specifically the Food Stamp Program (FSP), the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC), the National School Lunch Program (NSLP) and the School Breakfast Program (SBP)?

**Question 2:** In the absence of existing research that can empirically support a causal relationship, what research approaches, including data sources, are necessary and feasible to fill any knowledge gaps? Which research issues are/are not feasible to address using existing data? What new data may be required? What measurement and analysis issues are relevant and how can they be resolved? What additional research questions are pertinent given the existing knowledge regarding the relationship of poverty, food assistance program participation, and overweight/obesity?

### **Response to Question 1**

**The panel concluded that to be able to determine the relationship between obesity and food assistance program participation, it is necessary to consider the difficulties and complexity of separating the effects of poverty from the potential effects of food assistance on any health or social outcome including obesity.** The challenge is in controlling for the effects of poverty, which is highly correlated with program participation. Because of the strength of the existing research on this point, it is imperative that this established association be presented as the first point in their consensus statement.

**The panel also concluded that the sparse research that has been published provides no consistent evidence of association and no evidence of a causal relationship between the four major FNS food assistance programs and overweight. Previous research has provided some information on components of the relationship, but no study has fully addressed the issues related to research design, such as selection bias, and measurement issues.** There is no published research that considers the relationship between participation in the WIC program and maternal obesity. There is no published research that provides evidence of a consistent relationship between participation in NSLP and SBP and overweight/obesity. The published research on Food Stamps indicates there is some association between program participation and overweight/obesity; but there is no evidence of causality. Only one study looked at the combined effects of participation in multiple programs on overweight/obesity among individual family members. Jones (2003) measured the effects of participating in NSLP, SBP and FSP and found no additive effect above the effects of any one program. However, it is not known if the combined impact of multiple program participation has any impact on overweight/obesity, or if

there are countervailing effects of multiple program participation on overweight/obesity among family members.

### **Response to Question 2**

**The panel concluded that new research is needed to determine the relationship between participation in nutrition assistance programs and overweight/obesity.** Because the relationships among poverty, nutrition assistance program participation and obesity are complex, the panelists suggested the importance of creating designs or methods to identify these relationships so that the true effects of food assistance programs can be appropriately measured. They cautioned against conducting new research without a greater understanding of all the possible impacts of participation in food assistance programs; regard to the magnitude of the issue and the opportunity costs for those research dollars. Panel members also emphasized the need for future research to consider the simultaneous effects of all three major elements—nutrition assistance program participation, poverty, and obesity—on one another. They cautioned that limiting the scope of research to the investigation of strict associations between just two of the elements might miss the larger reality.

### **Panel's Recommendations:**

**All types of studies should be given equal priority in consideration by FNS.** Although recognizing that a randomized controlled trial is the “gold standard” in terms of research design, the panel agreed that this approach is probably not feasible because it would not be ethical to deny entitlement programs to anyone including control subjects in a study of food assistance programs in the United States.

**Research efforts should include a mix of small in-depth studies beginning with exploratory research approaches that are informative about the relationship and can provide a justification for moving to designs that are more expensive.** These studies are useful in identifying the likely mechanisms, cultural dimensions and local and regional variations that contribute to the understanding of the complexity of the relationship.

**Large-scale longitudinal studies are needed to provide the best possible evidence of the timing and direction of any relationship between program participation and obesity.** The generalizability of findings is extremely important. Small, local, special population studies are excellent first steps in a research program but have to be followed by large scale research that can provide credible estimates relating to the entire target population of participants.

**Methodological issues have weakened the current research and need to be controlled for in future research.** The available data for examining an association between obesity and participation in food assistance programs has several limitations. Sampling issues included sample size, over sampling of some groups, and whether or not conducting a number of small studies would be sufficient to draw any conclusions. The panel agreed that a national sample would be the ideal but that a mix of small and large studies might be able to capture important information to support future national research. Data collection issues included a discussion of personal interviews vs. phone interviews, the length of time between initial and follow-up interviews, the length of time a population should be followed; and how to maximize response rates. It was decided that a longitudinal study lasting four years would capture enough data.

**While no single type of study may provide the definitive answer to the issue, various types of studies can contribute to our overall understanding of the problem and offer potential solutions.** The panel identified four approaches that might be successful in adding to the knowledge about this relationship.

- Use natural opportunities for controlled trials, including taking advantage of new approaches to program delivery in nutrition assistance programs;
- Add features and questions into existing longitudinal and other studies by incorporating questions and measurements related to obesity including height, weight, dietary intake, program participation, and relevant control variables;
- Initiate smaller in-depth studies that focus on specific target populations of limited size to help clarify specific aspects of the relationship between obesity and program participation; and
- Identify and use existing data sets that have not been fully exploited to understand causal relationships.

**The panel also identified potential research opportunities and challenges.** Since each of the four programs examined has unique issues and opportunities associated with program rules and structure, the research suggestions were program specific:

- FSP: A challenge to conducting FSP research of this kind is participation dose which makes it difficult to follow recipients over a meaningful period of time. Another major measurement challenge is the household being the unit of analysis making it difficult to measure FSP food distribution by individual. Possible research efforts could be designed to take advantage of research opportunities such as a natural intervention through food stamp outreach programs for eligible non-participants. Researchers could track people that join the program after an outreach effort, to determine potential effects of program participation. In addition, panelists noted that the FSP offers the opportunity to intervene through family intervention and nutrition education to determine whether such interventions change the outcome when food program participation is kept constant.
- National School Lunch and School Breakfast: These programs present challenges to designing appropriate research efforts. There are multiple components and diverse delivery systems within each program which would make it necessary to sample on the school or district level in order to have a consistent delivery system or, alternatively, to include detailed controls for type of delivery system. Even when sampling on a school or district level, there will be issues related to variation in school meal content across districts. The biggest research challenge is measuring intake of school meals and the degree to which they contribute to overweight or obesity. The federally funded portion of meals provided is only one component of the food environment in the schools.

A possibility for a research study could include incorporating more variability in the contents of school lunches like programs that are being developed in school districts that promote healthy eating. It may be possible to build some measures of total food intake through studies that examine food waste. Another potential research opportunity is to examine dietary changes in low-income children who are moved to higher income schools through school choice and/or voucher experiments.

- **WIC:** Challenges to research on the relationship between participation in the WIC Program and overweight/obesity include several measurement issues. It is difficult to know who is consuming the WIC food in a given household. Since the focus of WIC is on the participant (pregnant woman or child), it is difficult to know whether a study is measuring the effect of program benefits on the persons for whom they are intended.
  - There are several opportunities for conducting research on the relationship between participation in the WIC Program and overweight/obesity. WIC has multiple program components (e.g., food package, health care, nutrition education) that can be manipulated to see how the nature of the local program (e.g., tailoring of food packages, referral to health services, etc.) can affect outcomes and quality measures.
  - WIC also offers the opportunity to examine issues related to postpartum weight loss—women are on the program for a limited time after their child’s birth (except for breastfeeding women) but their infants participate for up to a year afterward, and children can participate up to age 5. With minimal effort, it may be possible to obtain ongoing weight gain/loss and diet information from mothers when they bring their children in for assessment/voucher pickup. However, selection issues would still exist. Those women who choose to stay on the program may be different from those who don’t.
  - Another opportunity would be to examine how variance in the type of providers, such as programs that are well integrated with primary/preventative health care might compare to programs operated by social service agencies. This might allow for examining the variance in service delivery approach as a factor, as well as providing comparison/control groups.

**The panelists concluded by highlighting a number of issues/questions related to measurement that had been discussed during the meeting and should be addressed in future research designs.**

How should impact on weight be measured? For example, should change in weight be the major factor measured, or should outcomes such as a person becoming overweight/obese after program entry or a person staying overweight/obese without measurable improvement be considered? It is also important that measurement issues be considered in the context of the length of time it would normally be necessary to capture data to reflect these changes.

How should program participation be modeled? Should it be a yes or no question in terms of participation within a specific time period? How the level of should need be accounted for, since nutrition assistance programs may have a differential effect depending on the degree of deprivation a family is experiencing? How should different and/or additive effects of participating in multiple programs be accounted for? How should the episodic nature of program participation be factored into research designs?

How should selection bias be examined? Of particular importance are factors such as changes in household composition and its impact on decisions related to food and diet, or stress-related factors such as losing or changing jobs, divorce, or family illness?

How can, and should community level data and neighborhood effects be included?

Does a child's height and weight provide enough information for infants and young children? Traditionally, weight management has not been an issue before 24 months of age, but this situation may change because of the trends we have been seeing in the overweight/obesity "epidemic." The panel concurred that this is an important factor to consider. Panelists concurred that information on how children have been fed could also be important. Are they being breastfed? For how long? When are they starting solid food? Are they being fed on demand?

## 1. INTRODUCTION

In September 2003, the U. S. Department of Agriculture (USDA) Food and Nutrition Service (FNS) contracted with ALTA Systems, Inc. to conduct a project with the goal of providing a comprehensive overview of the relationship between poverty, program participation and obesity by conducting an in depth literature review; and convening an expert panel. The project goals were to: (1) Conduct a critical review of existing studies and other literature to determine if there is a sound empirical basis for identifying a relationship among poverty, participation in food assistance programs, and overweight/obesity; and (2) If the existing research was not found to be conclusive, identify what research approaches, including data sources, would be necessary and feasible to fill the knowledge gaps

Many low-income individuals are both obese and participants in one or more of the 15 food assistance programs operated by FNS. This network of programs plays an important role in providing a nutrition safety net that ensures low-income American families have access to a healthy and nutritious diet. This project focused on the four largest food assistance programs. These four programs accounted for approximately 90% of FNS' food assistance expenditures in FY2003.

- **Food Stamp Program (FSP):** Benefits across the country are tied to the provision of a low-cost nutritious diet sufficient to sustain an active, healthy life.
- **Special Supplemental Nutrition Program for Women, Infants and Children (WIC):** Food packages are tailored to specific nutrition requirements.
- **National School Lunch Program (NSLP) and the School Breakfast Program (SBP):** Sets nutrition standards for school meals served to America's children.

Obesity is a major public health concern. It is a risk factor for chronic diseases such as coronary heart disease, certain types of cancer, stroke, diabetes, hypertension, and osteoporosis (LSRO 1995). Of even more concern is that medical professionals are now seeing children with these conditions that were once associated only with adults (Hassink, 2003; Freedman, 2002).

## 2. PROJECT DESCRIPTION

### Expert Panel:

A panel of experts was convened in Washington DC on March 2-3, 2004. The panel represented a cross section of individuals with demonstrated expertise in areas of research design and development, social research methodology, nutrition, obesity, food assistance programs, food insecurity, and poverty.

Panel Member and Affiliation	Areas of Expertise
<b>Adam Drewnowski, M.D., PhD</b> University of Washington, Center for Public Health and Nutrition.	Dietary choices and food preferences, obesity and eating disorders, dietary quality assessment, and nutrient intake.
<b>Edward A. Frongillo, Jr. PhD</b> Division of Nutritional Sciences, Cornell University, New York.	Food insecurity, anthropometric assessment hunger and poverty. Extensive experience in the evaluation of the effectiveness of food assistance programs.
<b>Diane Gibson, PhD</b> Baruch College of the City University of New York. (CUNY).	Issues surrounding poverty and obesity. Strong familiarity with food assistance programs, especially regarding the relationship between the Food Stamp program and obesity in low-income individuals.
<b>Sonya Jones, PhD</b> University of Tennessee, Knoxville, Tennessee.	The social determinants of healthy eating, community-based nutrition issues, and longitudinal effects of poverty on weight gain and overweight/obesity.
<b>Christine Olson, PhD, R.D</b> Division of Nutritional Sciences, Cornell University, New York.	Her area of expertise is in obesity and relationships of health behaviors (eating, physical activity, pregnancy weight gain), to body weight in women, infants and children. She also studies the measurement and consequences of hunger and food insecurity among low-income populations. She is experienced in food insecurity research and in nutrition outcomes in food assistance programs.
<b>Barry Popkin, PhD</b> Population Center & School of Public Health, University of North Carolina, Chapel Hill, North Carolina.	Expertise is in obesity area, focused on understanding patterns and determinants of dietary, physical activity and obesity patterns among adolescents and adults. Active in US and global food and nutrition areas, and large-scale program and policy initiatives addressing obesity and other nutrition-related non-communicable disease. He has strong ties to food assistance programs, and is knowledgeable in the policy issues related to nutrition and disease prevention.
<b>Peter Rossi, Ph D</b> Professor Emeritus, University of Massachusetts at Amherst. He is also the Director of Evaluation Design and Analysis, a consulting firm.	Sociology and evaluation. The author of <i>Feeding the Poor: An Analysis of Five Federal Nutrition Programs.</i> , he is also the prime author (with Lipsey and Freeman) of <i>Evaluation: A Systematic Approach</i> . He brings a strong research background in food assistance outcome research and in research methods.



The meeting provided a forum for critical assessment of the research literature as well as a discussion of issues related to poverty, food assistance program participation, and overweight/obesity. The panel was tasked to develop a consensus statement addressing the two major objectives of the project. Using the literature review as a starting point for discussion, the panel assessed the methodological strengths and limitations of current research findings.

### **Literature Review:**

A rigorous review of the research literature was conducted to identify relevant information pertaining to the relationship among poverty, participation in food assistance programs and overweight/obesity. Sources included journals, government reports, books, unpublished manuscripts and dissertations, presentations and personal communication with researchers and experts in the field who have conducted or were currently conducting related research. Empirical research was favored over opinion. Opinion pieces selected were included only if they referenced scientific studies as the basis of their conclusions.

The major criterion for the research studies was that they considered FNS program participation in their examination of the relationship (including existence and direction of causality) between overweight and/or obesity and poverty. An evidence-based matrix was constructed to facilitate comparison of strengths and weaknesses of the research design as well as to provide a brief overview of the content. The data elements were: (1) purpose of study; (2) type of study; (3) food program referenced; (4) data source; (5) measurement; (6) sample type; (7) sample size; (8) study design; (9) geographic location of study; (10) population studied; (11) definition of obesity/overweight; (12) key findings; (13) study limitations; and (14) recommendations for further research. The search was limited to articles in English referencing

studies conducted in the United States between 1994 and 2004. (See Appendix A for a more detailed description of the approach used to generate the research literature for the project).

Initially, thirty-four research articles met the criteria for inclusion and formed the reference base for the panel discussions. They were abstracted and organized by category. The panel was provided with the annotated bibliography, data matrix and complete copies of all material that had been identified. Additional studies suggested by panel members were also included in the reference base. The panel agreed that the relationship between poverty (as measured by multiple socioeconomic factors) and overweight/obesity was a critical issue that must be addressed before addressing the impact of program participation. Therefore, the research literature germane to that issue was included for discussion as it provided important contextual information and background for the panel discussions.

The panel edited and revised the matrix and annotated reference list based on their review of these materials. Twelve research studies (eleven published in peer-reviewed journals) were identified that met enough of the criteria to merit further discussion during the panel's meeting in March 2004. These are identified in the following table. Other sources were used as background and justification of positions taken during the discussions.

<b><u>FSP</u></b>		
Gibson D	(2004)	Long-term food stamp program participation is differentially related to overweight in young girls and boys Journal of the American Society for Nutritional Sciences, 134(2): 372-379
Gibson D	(2003)	Food stamp program participation is positively related to obesity in low income women Journal of Nutrition, 133:2117-2118
Hofferth SL, and S Curtin	(2004)	Do Food Programs Make Children Overweight? Working Paper
Jones S, Jahns L, Laraia B, and B Haughton	(2003)	Lower risk of overweight in school-aged food insecure girls who participate in food assistance: results from the panel study of income dynamics child development supplement Archives of Pediatric and Adolescent Medicine, 157(8) 780-4
Townsend M, Peerson J, Love B, Achterberg C, and S Murphy	(2001)	Food insecurity is positively related to overweight in women Journal of Nutrition, 131(6): 1738-45
<b><u>WIC</u></b>		
Center for Disease Control (CDC)	(1996)	Nutritional status of children participating in the Special Supplemental Nutrition Program for Women, Infants, and Children--United States, 1988-1991 Morbidity and, Mortality Weekly Rep, 45(3): 65-9
Cole N	(2001)	The prevalence of overweight among WIC children WIC-010PCOM U S Department of Agriculture, Food and Nutrition Services, Office of Analysis, Nutrition and Evaluation
Mei Z, Scanlon K, Grummer-Strawn L, Freedman D, Yip R, Trowbridge F	(1998)	Increasing prevalence of overweight among US low-income preschool children: the Centers for Disease Control and Prevention pediatric nutrition surveillance, 1983 to 1995 Pediatrics, 101(1): E12
<b><u>NSLP and SBP</u></b>		
Gordon A, Devaney B, & J Burghardt	(1995)	Dietary-effects of the national school lunch program and the school breakfast program American Journal of Clinical Nutrition, 61(1): S221-S231
Hofferth SL, and S Curtin	(2004)	Do Food Programs Make Children Overweight? Working Paper
Jones S, Jahns L, Laraia B, and B Haughton	(2003)	Lower risk of overweight in school-aged food insecure girls who participate in food assistance: results from the panel study of income dynamics child development supplement Archives of Pediatric and Adolescent Medicine, 157(8) 780-4
Melnik T, Rhoades S, Wales K, Cowell C, and W Wolfe	(1998)	Overweight schoolchildren in New York City: prevalence estimates and characteristics International Journal of Obesity and Related Metabolic Disorders, 22(1): 7-13
Wolfe W, Campbell C, Frongillo E, Haas J, and T Melnik	(1994)	Overweight schoolchildren in New York State: prevalence and characteristics American Journal of Public Health, 84(5): 807-13

The panelists were asked to use the identified research, their individual professional and academic research experience and their focused discussions to address the following questions during the panel meeting:

**Question 1:** Does a sound empirical basis exist for determining the relationships among overweight/obesity, poverty, and participation in the four major FNS food assistance programs—specifically the Food Stamp Program (FSP), the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC), the National School Lunch Program (NSLP) and the School Breakfast Program (SBP)?

**Question 2:** In the absence of existing research that can empirically support a causal relationship, what research approaches, including data sources, are necessary and feasible to fill any knowledge gaps? Which research issues are/are not feasible to address using existing data? What new data may be required? What measurement and analysis issues are relevant and how can they be resolved? What additional research questions are pertinent given the existing knowledge regarding the relationships of poverty, food assistance program participation, and overweight/obesity?

## **RESPONSE TO QUESTION 1**

### **A. Poverty, as measured by household income, has been established to be associated with obesity in some population groups in the United States**

The potential mechanisms underlying the observed links between obesity and different measures of socioeconomic status may include biological pathways, family, social and cultural factors, as well as the characteristics of food environments. Life events such as change in marital status, loss of job, death in the family may lead normal weight persons to change behaviors that could increase the

**Question 1:** Does a sound empirical basis exist for determining the relationship among overweight/obesity, poverty, and participation in the four major FNS food assistance programs—specifically the Food Stamp Program (FSP), the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC), and the National School Lunch Program (NSLP)/ School Breakfast Program (SBP)?

risk of change in weight status (Stunkard and Sorenson, 1993; Wolfe, Sobal , Olson, Frongillo 1997; Gortmaker 1993). Neighborhood effects such as living in areas with depressed economic conditions, inner city or rural areas with high unemployment levels; and low wage employment opportunities have similar effects. For example, results from contemporary research in neurobiology suggest stresses resulting from such events may lead to changes in weight and promote central adiposity through hormonal changes (Dallman, 2003).

Before any conclusive statements about the relationship between obesity and participation in food assistance programs can be made, multiple indices of low socioeconomic status (e.g., low educational level, income, household assets, and occupation) and socio-cultural factors associated with increased risk of obesity in most population groups, must be taken into account. (Drewnowski, 2004).

Both physical activity and nutrition must be addressed to reduce the prevalence of obesity. Recent data from Australia, the United States and Europe show increased self-reported energy intake associated with obesity, The effect of increased energy intake is compounded by sedentary lifestyles (Stubbs and Lee 2004). Environmental factors may play an important role influencing physical activity (Booth SL, et al 2001). Wilson (2004) compared perceptions of access and safety for physical activity among residents who were stratified as low or high SES. Respondents from low-SES areas reported engaging in less PA based on CDC recommendations. They reported higher perceptions of neighborhood crime, unattended dogs, unpleasantness of neighborhoods, untrustworthy neighbors, and less access to public recreation facilities (Wilson et al 2004).

To determine this relationship, it is necessary to consider the difficulties and complexity of separating the effects of poverty from the potential effects of food assistance on any health or social outcome including obesity. The challenge is in controlling for the effects of poverty, which is highly correlated with program participation. Because of the strength of the existing research on this point, the panel decided that it was imperative that this established association be presented as the first point in their consensus statement.

Highest rates of obesity occur among groups with low income and low education (Gortmaker 1993; Galobardes 2000; Sobal and Stunkard 1989, Jeffery and French 1996, Jeffery, French, and Spry 1991, Sobal 1991, Stunkard 1996 Zhang and Wang 2004). In white females for example, the research suggests an association between poverty and an increased risk of obesity beginning in adolescence. In males however, research suggests that poverty is associated with a decreased risk of obesity. Sobal and Stunkard (1989), who summarized a great deal of previous literature about SES and overweight and obesity found an inconsistent relationship across studies for men. For example, while it would be expected, and some data supports the hypothesis of low SES and obesity in males, in some population groups, African American and Mexican males in particular, the relationship between socioeconomic status and the risk of obesity seems to go in the opposite direction – that is, low socioeconomic status of these two groups is associated with a decreased risk of obesity.

**B. The sparse research that has been published provides no consistent evidence of association. There is no evidence that there is a sound empirical basis of a causal relationship among any of the four major FNS food assistance programs and overweight or obesity.**

Previous research has provided some information on components of the relationship, but no study has fully addressed the issues related to research design, such as selection bias, and measurement. There is no published research that considers the relationship between

participation in the WIC program and maternal obesity. Several studies (CDC 1996; Mei et al., 1998; Rose et al., 1998; Wilde et al., 2000; Cole, 2001; Siega-Riz 2004) examined the relationship between child participation in WIC and height and/or weight status. All were descriptive studies restricted to WIC participants. None addressed obesity issues. There is no published research that provides evidence of a consistent relationship between participation in NSLP and SBP and overweight/obesity (Gordon et al., 1995; Wolfe et al., 1994; Melnik et al., 1998; Jones et al., 2003).

The published research on Food Stamps indicates there is some association between program participation and overweight/obesity; but there is no evidence of causality. The best available information regarding the relationship between women's participation in the Food Stamp Program and obesity is from studies by Gibson (2003) and Townsend et al. (2001). Both were somewhat limited in their ability to support definitive conclusions about the relationship between women's participation in food assistance programs and obesity.

Gibson, using nationally representative data from the 1985 to 1996 waves of the National Longitudinal Survey of Youth 1979, found that both current participation and long-term participation in the Food Stamp Program were significantly related to an increased risk of obesity for low-income women. However the data does not contain elements that would support an in-depth examination of participation patterns nor to accurately classify non-participant households as potentially eligible. The study does not control or account for food insecurity which is an important intervening variable that has the potential to confound the main effect. The inclusion of factors that take into account unobserved differences across individuals which do not vary over time, was not thought to fully account for potential differences between participants and non-participants related to both obesity and program participation (e.g., specific life events such as depression). In addition, although Gibson's study included long-term data related to program participation, it did not look at the incidence of weight gain but rather measured obesity at a single point in time.

Townsend et al., using national data from the 1994-1996 Continuing Survey of Food Intakes by Individuals, similarly found that participation in the Food Stamp Program was associated with an increased risk of overweight in women. Although controlling for food insecurity, the study relied on cross-sectional data, which does not allow for a determination of causality.

Few papers have considered the relationship between men and children's participation in the FSP and obesity. Gibson (2004) used the National Survey of Youth 1979 Child Sample to examine the relation between long-term Food Stamp Program participation and overweight in children and found an increased risk of overweight among young girls whose families participate in the Food Stamp Program. There is a negative and weakly significant relationship between long-term FSP participation and overweight for young boys. In contrast, using the 1997 Panel Study of Income Dynamics Child Development Supplement, Jones (2003) found a lower risk of overweight in school-aged food-insecure girls who participate in food assistance. However, this study does not have measures of food insecurity.

No studies were identified that link program participation to dietary change and in turn to change in weight status. Although there are studies identified that demonstrated that participation in the FSP increased total caloric intake and had a significant effect on the availability of food energy at the household level, they did not address individual weight gain and obesity (Currie, 2003; Fox et al., 2004; Hamilton and Rossi, 2002; Cuellar, 2003; Wilde et al., 2000; Gleason, 2000).

#### Combined Effects of Participation in Multiple Food assistance Programs

Although some of the studies referenced above have simultaneously considered the effects of participation in the FSP, WIC, and the NSLP and SBP on the dietary intakes of



households, only one has looked at the combined effects of participation in multiple programs on overweight/obesity among individual family members. Jones (2003) measured the effects of participating in NSLP, SBP and FSP and found no additive effect above the effects of any one program. However, it is not known if the combined impact of multiple program participation has any impact on overweight/obesity, or if there are countervailing effects of multiple program participation on overweight/obesity among family members.

## **RESPONSE TO QUESTION 2**

The expert panel concluded that new research is needed to determine the relationship between participation in nutrition assistance programs and overweight/obesity and offered several suggestions as to how FNS might proceed. Because the relationships among poverty, nutrition assistance program participation, and obesity are complex, the panelists suggested the importance of creating designs or methods to identify these relationships so that the true effects of food assistance programs can be appropriately measured.

They cautioned against conducting new research without a greater understanding of all the possible impacts of participation in food assistance programs; regard to the magnitude of the issue and the opportunity costs for those research dollars. Panel members also emphasized the need for future research to consider the simultaneous effects of all three major elements—nutrition assistance program participation, poverty, and obesity—on one another. They cautioned that limiting the scope of research to the investigation of strict associations between just two of the elements might miss the larger reality.

### Limitations of the Previous Research and Needs for Future Research

The available research for examining an association between obesity and participation in food assistance programs has several limitations. The panel began their discussion by

identifying methodological issues that have weakened the current research and need to be addressed in future research.

**Selection bias:** This critical issue needs to be addressed and controlled for. It is a result of the systematic error in creating or defining comparison groups that differ in observed and non-observed measures. This source of error may influence results and thus limit the level of confidence of the results. The panel discussed some of the sources of selection bias that is present in the current research on the relationship among food assistance programs, poverty and obesity.

- An important potential source of selection bias is the individual's propensity to participate in a program. The decision to participate is complex and can be conceptualized in terms of its cost (both economic and social) and benefit.
- Individuals may learn about and apply for food stamps through their contact with other social assistance programs resulting in a higher food stamp participation rate than similar individuals. For example, those whose health conditions lead them to the Medicaid system and referral to WIC. Conversely, those individuals who are not at nutritional risk but are similar on other characteristics would not be included for participation in that program.

**Data and Measurement Issues:** Data sources used in recent research were designed to approach other, often related, issues but were generally not focused on the complexity of the obesity-food assistance relationship and other factors, and often did not take into account or completely control for potential sources of measurement error.

Most of the data sources currently used in the studies reviewed used aged data that may not completely reflect the current relationship between obesity and program participation.

Few studies have identified and tracked control populations so that meaningful comparisons could be made between participants and non-participants. The non-participants in the data sets that have been used do not necessarily represent a reasonable comparison group to participants (even with the use of statistical controls) and therefore better statistical controls are necessary.

Participation needs to be accurately defined. Accurate characterizations of eligibility, enrollment, “dose” of participation both in terms of time and level of benefit, local program aspects that influence participation (e.g., universal free breakfast or WIC packages) are needed. None of the studies adequately addressed measures of exposure to the program. Participation is most often measured as a survey question; which does not provide enough data to fully evaluate and categorize level of program participation.

Another source of measurement error that can lead to misclassification of low-income non-participants is based on incomplete information about eligibility criteria not associated directly with household income. Many data sources include information on income but do not include information on assets or other sources of capital (such as unreported income). Also little attention is usually paid to the way income is calculated in the data base as opposed to how the program computes income for eligibility purposes (individual vs. household; monthly vs. annual).

Benefits provided to the household complicate the assessment of the effects of these programs on individuals since the division of program benefits among family members is not usually measured. There are indirect benefits to the household when the unit of analysis is the individual and similarly to the individual when the unit of analysis is the household. Food distributed within the household is often treated as available capital that can be leveraged and not always based on household availability or the individual’s participation.

**Design Issues:** Since experimental methods have not been used, estimates of the effects of program participation on dietary outcomes may be biased by unobserved differences between participants and non-participants. As no causal model can be constructed, we are confined to discussion of measures of association.

An important factor that is not usually taken into account involves physical and financial access to healthier diets. The structure of food prices is such that energy dense foods, often containing refined grains, added sugars or added fats represent the lowest cost option to the consumer. In contrast, the recommended healthier diets are likely to cost more. Computer modeling of optimal diets at a minimum cost led to energy dense fat-rich diets that were similar in composition to those consumed by the poor (Drewnowski, 2004; Nestle, 1998).

Continued selection of low-cost energy-dense but nutrient-poor foods may have metabolic consequences. In clinical and laboratory studies, high energy density and the high palatability of sweets and fats were associated with higher energy intakes and, in some cases, weight gain. The observed association between economic deprivation and obesity may involve the low cost and good taste of energy dense foods (Drewnowski, 2004; Darmon 2003; Leibtag and Kaufman 2003).

The challenges of understanding how food assistance might change dietary intake, and therefore body weight, limit the ability to make causal links between food assistance and obesity, were those links to exist. Dietary intake is difficult to adequately collect. It is even more difficult to attribute intake to specific economic or program resources using the available data sources. Perceptions of body weight and health vary by ethnic and cultural background, as does acceptability of program participation. Therefore, the impact of food assistance on food consumption and body weight has to be understood in the appropriate ethno-cultural context. Measures of heritage, acculturation and region are important to understanding this relationship as well (Lin, Huang and French, 2004; Gordon-Larsen, Adair and Popkin, 2003).

### **3. PANEL RECOMMENDATIONS**

Although recognizing that a randomized controlled trial is the “gold standard” in terms of research design, the panel agreed that this approach is probably not feasible since it would not be ethical, and not allowable in the United States, to deny entitlement programs to anyone including control subjects in a study of food assistance programs. Ideally, such a study would include variation in levels of benefit or service, which is not legally possible within the FNS programs, and might only be obtained by setting up experimental programs outside the U.S. An alternative approach would be to conduct a non randomized controlled trial using a regression discontinuity design. It controls for selection bias by comparing three groups – non-eligibles, eligible non-participants and participants. Including non-eligibles improves the comparability between the two groups of interest. Since the eligibility rule is based on a variable that can be expressed as being continuous, the impact on participants on the margin between eligibility and non-eligibility is identifiable independent on self selection factors. (Heckman 1995)

All types of studies should be given equal priority in consideration by FNS. The panel suggested that research efforts should include a mix of small in-depth studies beginning with exploratory research approaches that are informative about the relationship and can provide a justification for moving to more expensive designs. These studies are useful in identifying the likely mechanisms, cultural dimensions and local and regional variations that contribute to the understanding of the complexity of the relationship.

Large-scale longitudinal studies are needed to provide the best possible evidence of the timing and direction of any relationship between program participation and obesity. The generalizability of findings is extremely important. Small, local, special population studies are excellent first steps in a research program but have to be followed by large scale research that

can provide credible estimates relating to the entire target population of participants. The required variables for large-scale studies are, at a minimum, valid, reliable, and long-term measures of the following: weight and height; food insecurity; multiple detailed information on income and how it is calculated for each program; marital status; employment status; household income; program participation data, propensity to seek help/assistance (which should include such elements as duration and participation cycles), level of benefit; poverty level, food insecurity, social demographic characteristics of various target populations, and detailed dietary intake data with some physical activity measures (including those associated with work, travel, and leisure activity). Other variables to consider in such studies may include: measures of individual food expenditures, measures of household assets (savings, net worth, etc.), nutritional knowledge, measures of self-efficacy, and other variables that may provide a more complete picture of program participation and confounding factors.

Panelists raised a number of issues regarding the nature of samples to be included in future research, including sample size, whether or not there should be over sampling of some groups, and whether or not conducting a number of small studies would be sufficient to draw any conclusions. They agreed that a national sample would be the ideal but that a mix of small and large studies might be able to capture important information to support future national research.

Panelists also discussed different methods of data collection, such as: personal interviews vs. phone interviews; the length of time between initial and follow-up interviews; the length of time a population should be followed; and how to maximize response rates. It was decided that a longitudinal study lasting four years would capture enough data.

Although there was some discussion about databases that might be modified to capture the additional data needed for determining the relationship between nutrition assistance and

obesity, no database could be identified that currently includes all of the appropriate data elements and follows them longitudinally. The panel agreed that more exploration of existing databases is needed to determine what is available, what is usable, and what can be modified and/or supplemented to capture the data necessary to determine a relationship between nutrition assistance program participation and obesity.

While no single type of study may provide the definitive answer to the question, various types of studies can contribute to our overall understanding of the problem and offer potential solutions. The panel identified four alternative approaches that might be successful in adding to the knowledge about this relationship:

- Use natural opportunities for controlled trials, including taking advantage of new approaches to program delivery in nutrition assistance programs;
- Add features and questions into existing longitudinal and other studies by incorporating questions and measurements related to obesity such as height, weight and dietary intake, program participation, and relevant control variables;
- Initiate smaller in-depth studies that focus on specific target populations of limited size to help clarify specific aspects of the relationship between obesity and program participation; and
- Identify and use existing data sets that have not been fully exploited to understand causal relationships.

The panel identified several potential research opportunities. Since each of the four programs we examined has unique issues and opportunities associated with program rules and structure, the research suggestions were program specific:

**FSP:** A natural intervention could occur through food stamp outreach programs for eligible non-participants. Researchers could track people that join the program after an outreach effort, to determine potential effects of program participation. In addition, panelists noted that the FSP offers the opportunity to intervene through family intervention and nutrition education to

determine whether such interventions change the outcome when food program participation is kept constant.

**National School Lunch and School Breakfast:** These programs present challenges to designing appropriate research efforts. There are multiple components and diverse delivery systems within each program which would make it necessary to sample on the school or district level in order to have a consistent delivery system or, alternatively, to include detailed controls for type of delivery system. Even when sampling on a school or district level, there will be issues related to variation in school meal content across districts.

The largest obstacle is involved in measuring intake of school meals the degree to which they contribute to overweight or obesity. The federally funded portion of meals provided is only one component of the food environment in the schools.

A possibility for a research study could include incorporating more variability in the contents of school lunch like programs that are being developed in school districts that promote healthy eating. It may be possible to build some measures of total food intake through studies that examine food waste. Another potential research opportunity is to examine dietary changes in low-income children who are moved to higher income schools through school choice and voucher experiments.

**WIC:** There are several opportunities for conducting research on the relationship between participation in the WIC Program and overweight/obesity. WIC has multiple program components (e.g., food package, health care, nutrition education) that can be manipulated to see how the nature of the local program (e.g., tailoring of food packages, referral to health services, etc.) can affect outcomes and quality measures.



WIC also offers the opportunity to examine issues related to postpartum weight loss—women are on the program for a limited time after their child’s birth (except for breastfeeding women) but their infants participate for up to a year afterward, and children can participate up to age 5. With minimal effort, it may be possible to obtain ongoing weight gain/loss and diet information from mothers when they bring their children in for assessment/voucher pickup. However, selection issues would still exist. Those women who choose to stay on the program may be different from those who don’t.

Another opportunity would be to examine how variance in the type of providers, such as programs that are well integrated with primary/preventative health care might compare to programs operated by social service agencies. This might allow for examining the variance in service delivery approach as a factor, as well as providing comparison/control groups.

Challenges to research on the relationship between participation in the WIC Program and overweight/obesity include several measurement issues. As mentioned earlier, it is difficult to know which persons are eating the WIC food in a given household. Since the focus of WIC is on the participant (pregnant woman or child), it is difficult to know whether a study is measuring the effect of program benefits on the persons for whom they are intended.

#### 4. SUMMARY

Many low-income individuals are both obese and are participants in one or more of FNS' food assistance programs. The sparse research that has been published provides no consistent evidence of association and no evidence to conclude that there is a sound empirical basis of a causal relationship among any of the four major food assistance programs and overweight/obesity.

The relationship among food assistance programs and overweight/obesity among participants is complex and requires a research approach that takes into account other contributing factors. One of the most important of these is poverty, which has already been established as associated with overweight/obesity for some groups.

Previous research has provided some information on components of the relationship, but no study has fully addressed the issues related to research design, such as selection bias, and measurement issues. The available data used for examining an association between obesity and participation in food assistance programs has several limitations. It was designed to approach other, often related, issues but was generally not focused on the complexity of the obesity-food assistance relationship and other factors, and often did not take into account or completely control for potential sources of design or sampling error. A comprehensive randomized control trial ("gold standard") design is probably not possible because of cost, ethical and/or potential legal issues. Therefore, less direct methods for approaching the question would be more realistic.

The panel identified four alternative approaches that might be successful in adding to the knowledge about this relationship.

- Use natural opportunities for controlled trials, including taking advantage of new approaches to program delivery in nutrition assistance programs;
- Add features and questions into existing longitudinal and other studies by incorporating questions and measurements related to obesity, including height, weight and dietary intake, program participation, and relevant control variables;
- Initiate smaller in-depth studies that focus on specific target populations of limited size to help clarify specific aspects of the relationship between obesity and program participation; and
- Identify and use existing data sets that have not been fully exploited to understand causal relationships.

The panelists concluded by highlighting a number of issues/questions related to measurement that had been discussed during the meeting and should be addressed in future research designs.

How should impact on weight be measured? For example, should change in weight be the major factor measured, or should outcomes such as a person becoming overweight/obese after program entry or a person staying overweight/obese without measurable improvement be considered. It is also important that measurement issues be considered in the context of the length of time it would normally be necessary to capture data to reflect these changes.

How should program participation be modeled? Should it be a yes or no question in terms of participation within a specific time period? How should the level of need be accounted for, since nutrition assistance programs may have a differential effect depending on the degree of deprivation a family is experiencing? How should different and/or additive effects of participating in multiple programs be accounted for? How should the episodic nature of program participation be factored into research designs?

How should selection bias be examined? Of particular importance are factors such as changes in household composition and its impact on decisions related to food and diet, or stress-related factors such as losing or changing jobs, divorce, or family illness?

How can, and should community level data and neighborhood effects be included?

Does a child's height and weight provide enough information for infants and young children? Traditionally, weight management has not been an issue before 24 months of age, but this situation may change because of the trends we have been seeing in the overweight/obesity "epidemic." The panel concurred that this is an important factor to consider. Panelists concurred that information on how children have been fed could also be important. For example: Are they being breastfed? For how long? When are they starting solid food? Are they being fed on demand?

## APPENDIX A: LITERATURE REVIEW DATA ELEMENT DEFINITIONS<sup>1</sup>

Selected sources were abstracted and entered into an evidence-based matrix. The data elements contained in the matrix are described below.

**Purpose of Study:** The purpose and/or hypothesis to be tested were assessed.

**Type of Study:** Studies were classified as being primarily original research or analysis of secondary data, a research summary or literature review, or an opinion or news commentary.

**Food Program Referenced:** Which, if any, food assistance programs were referenced, namely, Food Stamps, WIC, or National School Lunch or School Breakfasts Programs.

**Data Source:** If given, the primary source of data, as well as the time period covered by the data was also recorded. Further information on what type of data were utilized, i.e., survey, focus group, interview, diary, physical measurements, or other, was also collected.

**Measurement:** The type of data measurement was assessed—either longitudinal, defined as having measurements over time, including time series data, or cross-sectional, with measurement at only one point in time.

**Sample Type:** Studies were characterized as having either representative or convenience samples. It was noted whether the sample was considered representative of the U.S. or another specific population, e.g., a specific city or country.

**Sample Size:** If applicable, sample size was recorded.

**Study Design:** Studies were assessed as to whether they employed an experimental, controlled trial design, or other (e.g., a literature review).

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<sup>1</sup> HSR, subcontractor to ALTA systems, Inc., prepared the literature review and data matrix.

**Geographic Location of Study:** It was noted whether the study included a population from a specific state or city, and urban or rural areas.

**Population Studied:** Demographic characteristics of the study population, including race, gender, socioeconomic status, ethnicity and age, were assessed.

**Definition of Obesity/Overweight:** Where applicable, the definitions of obesity and overweight as used in the study were recorded.

**Key Findings:** The major conclusions of the study were summarized.

**Study Limitations:** Limitations in the data, design, assumptions, or other aspects of the study, as identified by the authors and/or abstractor, were recorded.

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