

Introduction

Since the mid-1940s, when concerns about the nutritional status of young men drafted for service in World War II led to establishment of the National School Lunch Program (NSLP), the U.S. Government has committed to ensuring that its citizens neither go hungry nor suffer the consequences of inadequate dietary intake.^{1,2} Over the years, many Federal programs have been deployed to meet this commitment. Today, the Federal nutrition safety net includes 16 distinct food assistance and nutrition programs (FANPs) (table 1). Administered by the Food and Nutrition Service (FNS), U.S. Department of Agriculture (USDA), the 16 programs together were funded at approximately \$38 billion in fiscal year (FY) 2002.³ An estimated one in five Americans participated in one or more FANPs at some point during FY 2002 (Oliveira, 2003).

Although FANPs vary greatly in size, target population, and benefit-delivery strategy, all provide children or low-income households with food, the means to purchase food, and/or nutrition education. Several programs also provide avenues for disbursement of surplus agricultural commodities. All FANPs share the main goal of ensuring the health of vulnerable Americans by providing access to a nutritionally adequate diet.

In recent years, the efficacy of the web of programs that make up the nutrition safety net has been questioned. In 1996, during the throes of welfare reform, Congress seriously considered abolishing key components of the current Federal system in favor of block grants to States. While this initiative was ultimately defeated, welfare reform—specifically the Personal Responsibility and

Work Opportunity Reconciliation Act of 1996 (PRWORA)—resulted in significant changes to several FANPs. Most of these changes tightened eligibility standards and/or reduced benefit levels.

The continued pressures of welfare reform, and the increased accountability encompassed in the Government Performance and Results Act (GPRA), are certain to lead to heightened scrutiny of all Federal assistance programs. In the past, much of the assessment of FANPs centered on issues related to program operations, such as whether only eligible participants received benefits. Future program reviews are likely to be more broadly based, to focus on program effectiveness, and to ask if the program is achieving its objectives.

Recent program policies have emphasized the nutrition focus of the FANPs, which separates them from other federally sponsored income support programs. Indeed, in FY 1998, FNS made a “renewed commitment to nutrition education in all FNS programs” and established a special staff within the agency to “refocus efforts toward nutrition and nutrition education” (USDA/FNS, 2003). The growing emphasis on nutrition education in the Food Stamp Program (FSP) is one example of this renewed commitment. In FY 1992, only five States had approved State plans for FSP nutrition education, and the Federal share of expenditures for FSP nutrition education was \$661,000. In FY 2002, 48 State agencies had approved FSP nutrition education plans and Federal expenditures for FSP nutrition education exceeded \$174 million (USDA/FNS, 2003). Most of this increase occurred after 1998 (Speshock, 1999).

A further example of the renewed focus on nutrition in the FANPs is the set of goals and core objectives defined in the FNS strategic plan for 2000-05 (USDA/FNS, 2000). One of two key goals is “improved nutrition for children and low-income people.” Core objectives under this goal include improving food security, promoting healthy food choices among FANP participants, and improving the quality of meals, food packages, commodities, and other program benefits.

In recognition of both the renewed emphasis on nutrition and nutrition education in the FANPs and the increasing Federal focus on program accountability,

¹Many World War II draftees who were rejected had nutrition-related problems, including stunted growth, missing or rotted teeth, and physical deformities associated with rickets or other severe nutritional deficiencies during infancy and childhood.

²The earliest version of a federally operated food assistance and nutrition programs was actually the New Deal food stamp program (operated in the 1930s). This program allowed poor households to purchase stamps that were redeemable for most foods. Households also received a supply of free bonus stamps that were redeemable for selected surplus commodities. The New Deal food stamp program was discontinued during World War II.

³The list of FANPs used in this report differs slightly from the list used by FNS. FNS considers the Nutrition Education and Training Program and Team Nutrition to be part of the National School Lunch and School Breakfast Programs. FNS also operates the Disaster Relief Program, a program that is not considered in this review because its role in the nutrition safety net is substantively different from that of the other FANPs.

Table 1—Federal food assistance and nutrition programs

Program	Year begun ¹	FY 2002 costs ²	FY 2002 participation ²
		<i>\$ millions</i>	
National School Lunch Program (NSLP)	1946 ³	6,857 ⁴	28,006,873 lunches per day
Special Milk Program (SMP)	1955	16	112,781,614 total half-pints
Commodity Supplemental Food Program (CSFP)	1968	110	427,444 participants per month
Summer Food Service Program (SFSP)	1968	263	121,865,417 total meals and snacks
Food Stamp Program (FSP)	1974	20,677	19,099,524 ⁵ participants per month
Special Supplemental Nutrition Program for Women, Infants, and Children (WIC)	1975	4,319 ⁶	7,490,841 participants per month
School Breakfast Program (SBP)	1975	1,566 ⁴	8,144,384 breakfasts per day
Nutrition Services Incentive Program (NSIP) ⁷	1975	152	252,748,643 total meals ⁸
Nutrition Education and Training Program (NET)	1977	0	0
Food Distribution Program on Indian Reservations (FDPIR)	1977	69	110,122 participants per month
Child and Adult Care Food Program (CACFP)	1978 ⁹	1,852 ⁴	1,691,448,979 total child meals and snacks; 44,570,764 total adult meals and snacks
Nutrition Assistance Program for Puerto Rico, American Samoa, and the Northern Marianas (NAP)	1981	1,362 ¹⁰	Not available
The Emergency Food Assistance Program (TEFAP)	1981 ¹¹	435 ¹²	611 million total pounds of food distributed
WIC Farmers' Market Nutrition Program (FMNP)	1992	25 ¹³	2+ million total participants ¹³
Team Nutrition Initiative (TN)	1995	10 ¹⁴	Not available
Senior Farmers' Market Nutrition Program (SFMNP)	2002	13 ¹⁵	Not available

¹ Year of permanent authorization. Several food assistance and nutrition programs started as pilot projects before being established as permanent programs.

² Unless otherwise noted, data on costs and participation were obtained from USDA/FNS administrative data for FY 2002 (<http://www.fns.usda.gov/pd>, accessed April 2003). Reported costs include all cash benefits/reimbursements, food/commodity costs (as applicable), and administrative costs.

³ In 1998, the program began covering snacks served in after-school programs. In FY 2002, a total of 122,914,873 snacks were served.

⁴ In FY 2002, an additional \$124 million was spent on State administrative expenses for the NSLP, the SBP, and the CACFP.

⁵ Individuals in participating households.

⁶ Excludes estimated cost of WIC Farmers' Market Nutrition Program (FMNP), based on FY 2002 appropriation for FMNP.

⁷ Formerly known as the Nutrition Program for the Elderly (NPE). In FY 2003, administration for the program was transferred to the U.S. Department of Health and Human Services. FNS continues to supply commodities and financial support to the program.

⁸ Total meals for FY 2001, the latest year for which FNS collected data.

⁹ The adult day care component was added in 1989. In 1999, the program expanded to serve children living in homeless shelters.

¹⁰ The FY 2002 grant for Puerto Rico was \$1,351 million, the grant for American Samoa was \$5.3 million, and the grant for the Northern Marianas was \$6.1 million.

¹¹ Until 1996, FNS operated a separate Commodity Distribution Program for Charitable Institutions, Soup Kitchens, and Food Banks. Under the Personal Responsibilities and Work Opportunities Reconciliation Act (PRWORA), this program was merged into TEFAP.

¹² In FY 2002, FNS donated an additional \$16 million in commodities to disaster relief and charitable institutions.

¹³ Cost reflects FY 2003 appropriation. Source: <http://www.fns.usda.gov/wic/FMNP/FMNPfags.htm>, accessed April 2003.

¹⁴ FY 2002 appropriation. Source: L. French (2002). Personal communication.

¹⁵ Based on FY 2002 appropriation (\$15 million) and residual carried over into FY 2003 (\$1.7 million). Source: <http://www.fns.usda.gov/wic/SeniorFMNP/SFMNPFY02.htm> and [SFMNPFY03.htm](http://www.fns.usda.gov/wic/SeniorFMNP/SFMNPFY03.htm), accessed April 2003.

USDA's Economic Research Service (ERS) contracted with Abt Associates Inc. to conduct the Nutrition and Health Outcomes Study. A major focus of the study was a comprehensive review and synthesis of existing research on the impact of FANPs on nutrition- and health-related outcomes. This report presents results of that effort.⁴

Identifying Relevant Research for Review

The objective of the literature review was to summarize current knowledge about the effects on FANP participation on nutrition- and health-related outcomes. The first step was a comprehensive literature search. The approach to identifying empirical studies to be included in the research summary followed principles in *The Handbook of Research Synthesis* (Cooper and Hedges, 1994). This text is generally accepted as a definitive reference on research synthesis. The cornerstone of the process is a comprehensive computerized search of bibliographic databases. The following sections describe the methods used to conduct the computerized search and the steps taken to cross-check and expand the resulting list of citations.

Computerized Literature Search

In defining parameters for a literature search, two key concerns are *recall* and *precision* (White, 1992). Recall refers to the hypothetical percentage of all relevant citations that are actually identified through the search. Precision refers to the percentage of identified citations that are ultimately judged relevant to the research synthesis. Precision and recall tend to vary inversely. A search designed to yield a high recall will invariably have less precision—that is, it will yield numerous irrelevant references. On the other hand, a search designed to be highly precise will yield fewer, more focused references but will run a greater risk of missing relevant research.

⁴A separate summary report (Fox and Hamilton, 2004) presents major findings from each of the detailed chapters included in this report. In addition, the Nutrition and Health Outcomes Study produced six other reports. One report reviews the research designs available to researchers interested in studying the effects of FANPs (Hamilton and Rossi, 2002) and another describes existing data sources that might be useful in these endeavors (Logan et al., 2002). The four other reports summarize the nutrition and health characteristics of low-income populations, using data from the third National Health and Nutrition Examination Survey (NHANES-III). The reports cover FSP participants and nonparticipants (Fox and Cole, 2004a), participants and nonparticipants in the Special Supplemental Nutrition Program for Women, Infants, and Children (Cole and Fox, 2004a), school-age children (Fox and Cole, 2004b), and older adults (Cole and Fox, 2004b).

The search completed for this summary emphasized recall over precision. In essence, it was accepted that staff would need to weed through numerous irrelevant citations to identify literature that was truly representative of the existing research. The search was highly inclusive and used overlapping search methods. The selection of searchable databases and search terms (keywords) were both carefully considered, as described below. The actual search was carried out by a research librarian with extensive experience in supporting social science research.

Selecting Searchable Databases

The first step in selecting databases was to define relevant disciplines (or fields of study) and research subject areas. After a careful review of available databases and their topical coverage, the following list of disciplines/subject areas was defined:

- Medicine and health
- Nutrition
- Nursing and allied health
- Health economics
- Health education
- Social science research
- Agricultural research, economics, and policy
- Education research
- Social services and public welfare
- Public health

These subject areas were used to select a group of searchable databases. The initial subject-specific list was expanded to include a number of more general databases targeted toward “gray” or unpublished research, including those that cover dissertations, conferences, foundation grants, ongoing research projects, and government documents. A total of 26 databases was included in the online search (table 2).

The *Dialog Information Retrieval Service* (Dialog) was selected as the main vehicle for the search. Among information retrieval services, Dialog provides access to the largest number of social science research databases via a single, integrated user interface. Indeed, as noted in table 2, Dialog provided direct access to all but three of the selected databases. It also provides such special features as the capability to search multiple databases simultaneously and to remove duplicates as they occur across databases.

Defining Search Parameters

Because the search was so large and complex, it was completed in two waves. The 26 databases were divided

Table 2—Searchable databases used in computerized literature search

Database name ¹	Database producer	Subject category
Ageline	American Association of Retired Persons	Social services and public welfare
Agricultural Online Access (AGRICOLA)	U.S. National Agricultural Research Library	Agricultural research; economics; policy
Biological and Agricultural Index (BAI)	H.W. Wilson Company	Agricultural research
Combined Health Information Database (CHID) ¹	U.S. National Institutes of Health	Health education; public health
Computer Retrieval of Information on Scientific Projects (CRISP) ²	U.S. National Institutes of Health	Public health; medicine and health
Conferences Papers Index	Cambridge Scientific Abstracts	General
Current Research Information System (CRIS)	U.S. Department of Agriculture	Nutrition
Dissertation Abstracts Online	University Microfilms, Inc.	General
Economic Literature Index (EconLit)	American Economic Association	Health economics
Education Research Information Center (ERIC)	U.S. Department of Education	Education research
Excerpta Medica (EMBASE)	Elsevier Science; Netherlands	Medicine and health; health economics; public health
Federal Research in Progress (FEDRIP)	U.S. National Technical Information Service	General
Foundation Grants Index	The Foundation Center	General
GPO Monthly Catalogue	U.S. Government Printing Office	General
Health and Wellness Database (HPD)	Information Access Company	Medicine and health; nutrition
HealthStar	U.S. National Library of Medicine	Health economics
Inside Conferences	British Library	General
MEDLINE	U.S. National Library of Medicine	Medicine and health; nutrition
National Technical Information Service Bibliographic Database	U.S. National Technical Information Service	General
Nursing and Allied Health Database ³	Cinahl Information Systems	Nursing and allied health; medicine and health; nutrition
Nutrition Abstracts and Reviews, Series A: Human and Experimental	CAB International; England	Nutrition
PAIS International	Public Affairs Information Service	Social science research
Social Sciences Index	H.W. Wilson Company	Social science research
Social Sciences Abstracts	H.W. Wilson Company	Social science research
Social SciSearch	Institute for Scientific Information	Social science research
Sociological Abstracts	Sociological Abstracts, Inc.	Social services and public welfare

¹ Searched via Dialog, except as noted.² Searched via the Worldwide Web.³ Searched via Data Star.

into two groups and each group was searched independently. Databases were grouped to minimize overlap; that is, those likely to yield duplicate records were grouped together to permit removal of duplicates before citations were downloaded.

For each set of databases, 16 separate searches were conducted—one for each program listed in table 3, as well as one using the generic terms “nutrition assistance,” “food assistance,” “nutrition supplementation,” and “nutrition education.” Each search included all of the search terms identified in table 4.

Searches were limited to English language documents and to records from 1973 to 2002.⁵ Program-specific

⁵The initial search was conducted in 1999. The bibliography was updated in 2002, before preparation of the final version of the report. The 2002 update included only published research. Additional published research was incorporated before final publication in 2004.

sets of citations were created by merging results of the two search waves and removing duplicate records.

Identifying Relevant References

All of the citations generated by the search were initially captured in a “browsing format” that provided title and indexing information (keywords used in indexing the citation in the database) without the cost of retrieving a full citation. These abbreviated citations were manually reviewed by chapter authors to identify sources that were potentially relevant for the research review. Because the focus of the literature review was the impact/effect of FANPs on nutrition and health outcomes, citations deemed potentially relevant were those that appeared to summarize research comparing program participants with nonparticipants. All citations selected for further review were downloaded in full format, consisting of a complete citation and, where available, an abstract.

Table 3—Program names, acronyms, and variants used in computerized literature search

Child and Adult Care Food Program (CACFP)	Nutrition Program for the Elderly (NPE) ³
Child Care Feeding/Food Program (CCFP)	Elderly Feeding Program
Adult Care Feeding/Food Program	Elderly Nutrition Program
Homeless Children Nutrition Program ¹	
Child Nutrition Homeless Demonstration Project ¹	School Breakfast Program (SBP)
	Breakfast Program
Commodity Distribution to Charitable Institutions, Soup Kitchens, and Food Banks ²	Special Milk Program (SMP)
Commodity Distribution Program ²	Supplemental Milk Program
Commodity Donation Program ²	
Commodity Supplemental Food Program (CSFP)	Special Supplemental Nutrition Program for Women, Infants, and Children (WIC)
Food Distribution Program on Indian Reservations (FDPIR)	Special Supplemental Food Program for Women, Infants, and Children
	WIC program
Food Stamp Program (FSP)	Summer Food Service Program (SFSP)
Food Stamps	Summer Feeding Program
National School Lunch Program (NSLP)	Team Nutrition (TN)
School Lunch Program	Team Nutrition Initiative (TNI)
Nutrition Assistance Program for Puerto Rico and the Northern Marianas (NAP)	Temporary Emergency Food Assistance Program (TEFAP)
Puerto Rico/Puerto Rican Nutrition Assistance Program	Emergency Feeding Program
	Emergency Food Program
Nutrition Education and Training (NET)	WIC Farmers' Market Nutrition Program ⁴
Nutrition Education and Training Program (NETP)	Farmers' Market Nutrition Program ⁴

¹In July 1999, the Homeless Children Nutrition Program was discontinued as a separate program and formally incorporated into the CACFP.

²Under PRWORA, the previously separate Commodity Distribution to Charitable Institutions, Soup Kitchens, and Food Banks Program was combined with the Temporary Emergency Food Assistance Program to form The Emergency Food Assistance Program (TEFAP).

³In 2001, the Nutrition Program for the Elderly (NPE) was renamed the Nutrition Services Incentive Program (NSIP).

⁴The Senior Farmers' Market Nutrition Program was not included in the search because the program was not established until 2002.

Table 4—Keywords used in querying searchable databases

General terms	Specific terms		
Food/nutrient availability Food/nutrient intake Food/nutrient consumption	Breakfast consumption Diet Dietary adequacy Dietary effects Dietary impacts Dietary intake Dietary outcomes Dietary quality Dietary patterns Dietary practices	Dietary trends Dietary variety Eating behaviors Eating practices Folic acid Food choices Food consumption Food costs Food expenditures Food intake	Food purchases Food selections Food use Healthy Eating Index (HEI) Nutrient availability Nutrient content Nutrient intake Nutritional adequacy Nutritional intake
Health-related behaviors Health-related practices	Alcohol use Breastfeeding Breast feeding Cigarette (tobacco) use	Cow's milk (use of) Drug abuse Drug use Immunizations	Infant feeding practices Perinatal care Prenatal care Smoking
Pregnancy and birth outcomes	Birthweight Birth weight Fetal growth Fetal outcomes Gestational age Head circumference Infant morbidity Infant mortality Intrauterine growth retardation	Length of gestation Light-for-date infants Low birthweight Low birth weight Low birth-weight Maternal morbidity Maternal mortality Maternal weight gain Neonatal morbidity Neonatal mortality	Neural tube defects Perinatal morbidity Pregnancy Pregnancy outcome(s) Prematurity Preterm delivery Preterm infants Very low birthweight Very low birth weight Very low-birthweight
Nutrition/health status Nutrition outcomes Health outcomes	Allergies Anemia Body Mass Index (BMI) Body measurements Body weight Bone density Fertility Folacin status Food intolerances Growth Growth rate Growth velocity Health	Health outcome(s) Health status Height Hematocrit Hemoglobin Iron deficiency Iron-deficiency Iron deficient Iron-deficient Iron status Length Malnutrition Morbidity	Mortality Nutrition Nutritional status Obesity Overnutrition Overweight Postnatal growth Skinfold(s) Stature Undernutrition Underweight Weight Weight gain
Other relevant outcomes	Behavioral development Cognitive development Cognitive performance Food insecurity	Food security Functional status Hunger School attendance	School performance Social isolation Quality of life
Health economics	Healthcare (access, utilization, needs, costs) Medical (care, costs, needs) Medicaid Medicare Medicaid costs Medicare costs		

Citations flagged as irrelevant for the research review included:

- General program descriptions.
- Program manuals and guidance materials.
- Descriptive research on program participation and/or costs.
- Descriptive research on participant characteristics.
- Research on issues related to program operations, such as use of electronic benefits transfer (EBT) in the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC).
- Research related to program accountability, fraud, or abuse.
- Research related to determinants of outcomes of interest with no mention of impact or effect of program participation (for example, research on factors that influence decisions about breastfeeding).

In addition, research that involved FANP participants but did not explicitly compare participants and nonparticipants was excluded. For example, studies that examined the effectiveness of a specific smoking cessation or breastfeeding promotion program among WIC participants were excluded, as were studies that examined specific interventions designed to decrease the fat content of school lunches. Although useful for other purposes, this type of research sheds no light on the impact of FANP participation on nutrition- and health-related outcomes.⁶

Not surprisingly, numerous relevant citations were located for the flagship FANPs (FSP, WIC, and NSLP). Many fewer citations were located for the smaller programs. Exclusion criteria were relaxed somewhat for programs that generated few relevant citations. Although the citations considered under these relaxed standards were not expected to include information on program effects or to lead to other relevant research,

⁶Much of this research on FANP participants (without nonparticipant controls) involved nutrition education interventions. Readers interested in general information on the effectiveness of such interventions are referred to a comprehensive series of literature reviews prepared by FNS. These reviews summarize research on the effectiveness of nutrition education for six population groups: pregnant women and caretakers of infants, pre-school-age children, school-age children, adults, older adults, and intermediaries, paraprofessionals, and professionals. Complete citations for these reports are provided in the reference list at the end of this chapter (highlighted with asterisks).

they were retained in the bibliography to ensure that the final report would provide general information about the type of research that has been done on the FANP in question.

Though the computer searches were comprehensive, as tables 2-4 demonstrate, any such search is imperfect. To guard against important omissions, initial lists of program-specific citations from the computer searches (minus the exclusions noted above) were cross-checked against several existing research reviews (Nelson et al., 1981; Rush et al., 1988; Fraker, 1990; Rossi, 1998; Besharov and Germanis, 2001), as well as against a listing of recent FNS research publications. A summary of preliminary citations was submitted to ERS and was reviewed by staff at ERS, FNS, and members of the project's expert panel. Additional citations provided by these reviewers were incorporated before documents were retrieved and reviewed.

Documents were obtained from Abt's in-house library, local university libraries, interlibrary loan, relevant Federal agencies, and, when necessary, from primary authors. All retrieved citations were reviewed by chapter authors. Using the exclusion criteria described previously, as well as a review of research design and methodology, authors identified research that provided empirical information on the effect of FANP participation on nutrition- and/or health-related outcomes. These documents formed the foundation of the research review. Other relevant references were identified by authors as they reviewed papers and reports and cross-checked bibliographies.

Organization of This Report

The next chapter provides an overview of the research designs and outcome measures used in the literature reviewed.⁷ **All readers are encouraged to read chapter 2 before reading any of the program-specific chapters that follow it.**

The remainder of the report consists of 14 chapters that summarize available research for all of the FANPs identified in table 1, with the exception of the Senior Farmers' Market Nutrition Program, which was not established until 2002. The Team Nutrition Initiative (TN) and the Nutrition Education and Training Program (NET) are covered in a single chapter.

⁷A more comprehensive discussion of the strengths and weaknesses of the various designs, as well as descriptions of other possible designs, can be found in a separate report (Hamilton and Rossi, 2002).

Each program-specific chapter includes the following:

Program Overview—A summary of the program’s legislative history and its benefits and eligibility requirements, with current information on program costs and participation, and, as appropriate, on current policy issues.

Research Review—A description and synthesis of research on the impact of the relevant FANP on nutrition- and health-related outcomes. Where no such research was identified, there is a description of the type of research that has been done and important or interesting findings from the most recent or most relevant research.

Summary—A review of what is and is not known about the nutrition- and health-related impacts of the FANP, with areas for future research identified.

For FANPs that have been widely studied, two types of tabular presentations are used to provide an overview of the breadth of existing studies and the relative consistency of their results:

- (1) Tables that summarize the important characteristics of each study, including the year published (or written, for nonpublished reports), data sources, population studied, sample size, research design, measure of program participation, and analysis method(s). Table 5 is an example.
- (2) Tables that summarize research results for a specific outcome or set of outcomes. These tables provide a visual overview of the patterns of research findings, using a format similar to that in table 6.

As with any distillation of complex data, these tabular summaries involved compromise. It is important that readers understand four aspects of this compromise before reading the program-specific chapters.

First, summaries do not provide information on the size of any effects detected or on the level of statistical significance reported. This information would greatly increase the size and complexity of the summary table, making it harder for the reader to see the general pattern of statistically significant effects. Interested readers should refer to original papers and reports for more

detailed information. Summary tables include all differences reported to be significant at the 5 percent level or better.

Second, nonsignificant results are reported in the interest of providing a comprehensive picture of the body of research. A consistent pattern of nonsignificant findings may indicate a true underlying effect, even though no single study’s results would be interpreted that way.

Third, to give a complete picture, summary tables present findings for all studies reviewed, including older studies and those with comparatively weak designs. However, when discussing conclusions that can be drawn from the available research, the authors intentionally avoid the simplistic and flawed approach of “vote counting” (adding up the number of studies that report differences favorable to participants). Rather, the authors give greater weight to findings from studies that have the strongest research designs and are most recent.

Finally, as in table 6, summaries of findings related to impacts on dietary intake show whether participants consumed more or less food energy or nutrients than nonparticipants, which is consistent with the general approach in the reviewed literature. Comparisons of participants and nonparticipants were most often based on mean intakes as a percentage of age- and gender-appropriate Recommended Dietary Allowances (RDAs), and study authors generally interpreted greater mean intakes among participants as evidence of a positive program impact.

This approach to assessing dietary intakes of groups was common practice at the time most of the studies reviewed in this report were completed. Readers are cautioned to avoid this “more is better” interpretation, however. The reality is that a significant difference in the mean intakes of two groups does not necessarily mean that the two groups differ in the proportion of individuals with inadequate diets. In recent years, methods to assess dietary intakes have improved substantially. For many nutrients, researchers can now reliably estimate the prevalence of inadequate intakes in specific population subgroups, which is discussed in more detail in chapter 2.

Table 5—Studies that examined the impact of the Food Stamp Program on dietary intakes of individuals**SAMPLE TABLE—INCLUDED FOR ILLUSTRATIVE PURPOSES ONLY**

Study	Data source ¹	Data collection method	Population (sample size)	Design	Measure of participation	Analysis method
Group IA: Participant vs. nonparticipant comparisons—Secondary analysis of national surveys						
Dixon (2002)	1988-94 NHANES-III	24-hour recall	Adults ages 20 and older	Participant vs. nonparticipant	Participation dummy	Multivariate regression
Bhattacharya and Currie (2000)	1988-94 NHANES-III	24-hour recall and nonquantified food frequency	Youth ages 12-16 (n=1,358)	Participant vs. nonparticipant	Participation dummy	Multivariate regression
Group IB: Participant vs. nonparticipant comparisons—State and local studies						
Fey-Yensan et al. (2003)	Low-income areas in Connecticut (1996-97)	Food frequency questionnaire	Low-income elderly living in subsidized housing (82% female) (n=200)	Participant vs. nonparticipant	Participation dummy	Chi-square tests and analysis of variance
Group IIA: Dose-response estimates—Secondary analysis of national surveys						
Gleason et al. (2000)	1994-96 CSFII/DHKS	2 nonconsecutive 24-hour recalls	Low-income individuals (n=3,935)	Dose-response	Benefit amount	Comparison of regression-adjusted means
Group IIB: Dose-response estimates—State and local studies						
Butler and Raymond (1996)	1980-81 FNS SSI/ECD and 1969-73 RIME	24-hour recall via telephone and in-person	Low-income elderly individuals (n=1,542) Low-income individuals in rural areas (n=1,093)	Dose-response	Participation dummy; bonus value	Multivariate endogenous switching model with selection bias adjustment

¹ Data sources:

CSFII = Continuing Survey of Food Intakes by Individuals.

DHKS = Diet and Health Knowledge Survey.

FNS SSI/ECD = Food and Nutrition Service Supplementary Security Income/Elderly Cashout Demonstration.

NHANES = National Health and Nutrition Examination Survey.

RIME = Rural Income Maintenance Experiment.

Note: this is a partial version of the actual table, included for illustrative purposes only.

Table 6—Findings from studies that examined the impact of the Food Stamp Program on dietary intakes of individuals

SAMPLE TABLE—INCLUDED FOR ILLUSTRATIVE PURPOSES ONLY

Outcome	Significant impact	No significant impact		Significant impact
	Participants consumed more	Participants consumed more/same	Participants consumed less	Participants consumed less
Food energy and macronutrients				
Food energy	Children Fraker (1990) [national; P-N]	Children Gleason (2000) [national; D-R] {preschool} Perez-Escamilla (2000) [2 sites; P-N] Rose (1998a) [national; D-R] Cook (1995) [national; P-N] Gregorio (1984) [national; P-N] Elderly Fey-Yensan (2003) [1 State; P-N] Weimer (1998) [national; P-N] Posner (1987) [6 sites; P-N] Lopez (1987a) [national; P-N] Butler (1985) [6 sites; P-N] Adults Gleason (2000) [national; D-R] All households Whitfield (1982) [1 city; D-R] Bishop (1992) [national; P-N]	Children Gleason (2000) [national; D-R] {school-age} West (1978) [1 State; D-R] Elderly Lopez (1987a) [national; P-N] Women Fraker (1990) [national; P-N]	Elderly Butler (1996) [6 sites; D-R]

See notes at end of table.

Continued—

Table 6—Findings from studies that examined the impact of the Food Stamp Program on dietary intakes of individuals**SAMPLE TABLE—INCLUDED FOR ILLUSTRATIVE PURPOSES ONLY**

Outcome	Significant impact	No significant impact		Significant impact
	Participants consumed more	Participants consumed more/same	Participants consumed less	Participants consumed less
Protein	<p>Children Fraker (1990) [national; P-N]</p> <p>All households Bishop (1992) [national; P-N]</p>	<p>Children Rose (1998a) [national; D-R] Cook (1995) [national; P-N] Gregorio (1984) [national; P-N]</p> <p>Elderly Lopez (1987a) [national; P-N] Posner (1987) [6 sites; P-N] Butler (1985) [6 sites; P-N]</p> <p>Adults Gleason (2000) [national; D-R]</p> <p>Women Fraker (1990) [national; P-N]</p> <p>Rural Butler (1996) [2 sites; D-R]</p> <p>All households Whitfield (1982) [1 city; D-R]</p>	<p>Children Gleason (2000) [national; D-R] Perez-Escamilla (2000) [2 sites; P-N] West (1978) [1 State; D-R]</p> <p>Elderly Fey-Yensan (2003) [1 State; P-N] Weimer (1998) [national; P-N] Lopez (1987a) [national; P-N]</p> <p>Adults Dixon (2002) [national; P-N]</p>	<p>Elderly Butler (1996) [6 sites; D-R]</p>

Notes: Cell entries show the senior author's name, the publication date, the scope of the study (for example, national vs. 1 city or 1 State), and the research approach (P-N = participant vs. nonparticipant study, D-R = dose response study).

Nonsignificant results are reported in the interest of providing a comprehensive picture of the body of research. As noted in chapter 1, a consistent pattern of nonsignificant findings may indicate a true underlying effect, even though no single study's results would be interpreted in that way. Readers are cautioned to avoid the practice of "vote counting," or adding up all the studies with particular results. Because of differences in research design and other considerations, findings from some studies merit more consideration than others. The text discusses methodological limitations and emphasizes findings from the strongest studies.

This is a partial version of the actual table, included for illustrative purposes only.

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- *Asterisked citations are literature reviews prepared by FNS (see footnote 6 in the text). These reports summarize information on the effectiveness of nutrition education interventions for specific population groups.