

Nutrition Services Incentive Program

The Nutrition Services Incentive Program (NSIP), formerly known as the Nutrition Program for the Elderly (NPE), is a U.S. Department of Agriculture (USDA) program that provides cash and/or commodities to agencies or organizations that sponsor Elderly Nutrition Program (ENP) sites. The ENP, which is administered by the U.S. Department of Health and Human Services (HHS), Administration on Aging (AoA), is the primary vehicle for the organization and delivery of nutrition and support services to the Nation's elderly. The program provides meals in both group and home settings. Although any person over the age of 60 is eligible to participate, local programs try to target elders with the greatest nutritional and/or social needs. In recent years, the home-delivered meals component of the program has grown dramatically, reflecting an increase in the number of frail, home-bound elderly.

Program Overview

The ENP was designed specifically to address problems of inadequate dietary intake and social isolation among the elderly. It began as a 3-year pilot program in 1968 and was permanently authorized in 1972, as a new title of the Older Americans Act (OAA). In enacting the program, Congress cited “an acute need for national policy which provides older Americans, particularly those with low incomes, with low-cost, nutritionally sound meals served in strategically located centers ... Besides promoting better health ... such a program would reduce the isolation of old age, offering Americans an opportunity to live their remaining years in dignity” (P.L. 92-258, Section 701).

The ENP provides daily meals to people age 60 and over in group settings (congregate feeding programs) and, when appropriate, at home (Meals-on-Wheels).¹³³ Spouses of age-eligible individuals are also eligible to participate, regardless of age. In addition, disabled people who live in elderly housing facilities, people who accompany elderly participants to congregate feeding sites, and volunteers who assist in the meal service may also receive meals through the ENP. Each recipient may contribute as much as he or she wishes

¹³³To be eligible for home-delivered meals, participants must be home-bound or otherwise isolated (Wellman et al., 2002).

toward the cost of the meal, but meals are free to those who cannot make any contribution.

The program is available to all age-eligible individuals, regardless of household income. However, the goal is to target those with the greatest nutritional, social, or economic need, particularly low-income minorities and elders living in rural areas (Wellman et al., 2002). Because the program is not means-tested, the ENP is the primary service system for elders whose incomes may be slightly greater than the income-eligibility requirements used for other programs, such as the Food Stamp Program or the Commodity Supplemental Food Program (Wellman et al., 2002).

The ENP is administered by a network of agencies devoted to the aging population, including State and Indian Tribal Organization (ITOs) units on aging, within-State area agencies on aging, and local delivery sites.¹³⁴ The program has grown substantially since its inception. In 1975, the program provided 48.5 million meals (HHS/AoA, 2002). In 1980, ENP providers served 168.4 million meals, an increase of almost 250 percent. The program continued to grow during the 1980s and 1990s, although at a slower pace. In FY 2001, the ENP served 253 million meals (USDA, Food and Nutrition Service (FNS), 2003).¹³⁵

Much of the increase in the ENP during the 1980s and 1990s was in home-delivered meals. In 1978, a program regulation that limited home-delivered meals to 10 percent of total meals was rescinded and separate authorizations were established for home-delivered and congregate meals (HHS/AoA, 2002). Subsequently, the relative size of the home-delivered meals component of the program began to increase steadily. In 1980, home-delivered meals represented 22 percent of all ENP meals. In 1991, home-delivered meals accounted for 43 percent of all ENP meals. By the end of the decade, home-delivered meals had increased to more than half (54 percent) of all ENP meals (HHS/AoA, 2002). This trend reflects an

¹³⁴Operation of the ENP by ITOs was authorized separately in 1978 under Title VI of the OAA. States and ITOs continue to be authorized under separate titles of the OAA, but ENP sites in both settings operate under the same program regulations.

¹³⁵USDA stopped maintaining data on the number of meals served in the ENP after FY 2001 because of changes in the program's administrative structure, as described in subsequent sections.

increased need for home-delivered meals as well as the availability of increased funding. Even with this dramatic growth, many ENP sites have waiting lists for home-delivered meals (Ponza et al., 1996).

USDA's involvement in the ENP began in 1975 when Congress authorized USDA to donate commodities to the ENP. The USDA program, known as the Nutrition Program for the Elderly (NPE), provided commodities to States and ITOs, which, in turn, distributed them to local ENP sites. In 1977, P.L. 95-65 allowed States and ITOs to elect to receive their NPE entitlement in the form of cash rather than commodities. Over time, the predominant type of support provided by the NPE shifted from commodities to cash. In FY 1999, only 2 percent of the \$140 million NPE appropriation was distributed to ENP meal providers as commodities (HHS/AoA, 2002).

When the ENP was reauthorized in FY 2000, the name for the USDA program was changed to the Nutrition Services Incentive Program (NSIP). In addition, the model for administration of the program was changed from a simple reimbursement model to an allocation model. Rather than reimbursing States and ITOs on a per meal basis based on the number of meals served the previous fiscal year, NSIP funds are now distributed to States and ITOs based on the number of meals served *relative to the total number of meals served by all States and ITOs*. The reason for this change was a desire to reward States and ITOs for efficient use of cash and/or commodities in providing meals to older adults (USDA/FNS, 2002).

In FY 2003, responsibility for the administration of the NSIP was transferred from USDA to HHS, although USDA continues to provide financial support and donated commodities. In FY 2002, USDA's contribution to the ENP was \$152 million (USDA/FNS, 2003).

Program Services

ENP providers are required to offer participants at least one "hot or other appropriate" meal per day 5 or more days per week. Providers may elect to provide additional meals. Congregate meal sites must be located in close proximity to areas with large concentrations of elderly residents and, to the extent possible, be within walking distance of participants' homes. When feasible, programs provide transportation for participants who are unable to travel to the meal site on their own. Home-delivered meals can be either hot or cold.

Historically, lunch has been the focal point of the ENP, and most congregate and home-delivered meal programs served lunch only 5 days per week. As the program has matured, however, local providers have incorporated service innovations that have allowed them to better meet participants' needs. In a 1988 survey of 450 ENP project sites, Balsam and Rogers (1991) found that many projects had expanded well beyond serving only lunch, particularly with regard to home-delivered meals. Half of the sites providing home-delivered meals offered meals on weekends and one in five offered supper. Comparable statistics for congregate meal sites were 17 percent and 10 percent, respectively. Other innovations reported by Balsam and Rogers included contracting with restaurants and diners to provide meals, exclusively targeting meals served at a given site to a particular racial/ethnic group, and regularly scheduled visits to congregate feeding sites by nursing home residents.

ENP sites have also developed noteworthy approaches to maximizing available Federal funding in order to serve more elders and provide them with needed services. The most recent national evaluation of the ENP "estimated that government funding investments in the ENP were tripled by the program's innovative use of volunteers, the collection of contributions by elders to the costs of meals, and the supplementation of Federal resources with State grants and private donations" (Balsam et al., 2000).

ENP funds can also be used for nutrition education and other appropriate services (O'Shaughnessy, 1990). Over time, the ENP has become an integral component of a comprehensive and coordinated system of home- and community-based services (HCBC) (Wellman et al., 2002). Services provided by ENP sites include transportation, shopping assistance, health screenings, wellness programs, information and referral services, and recreational and social activities.

Nutrition Standards for ENP Meals

In the early 1990s, concerns were raised about the nutritional integrity of the ENP. During the OAA reauthorization hearings in 1992, several professional groups involved in the ENP, including the American Dietetic Association and the National Association of Nutrition and Aging Service Programs, encouraged Congress to incorporate minimum standards for nutrition services provided under the OAA. The majority of the recommendations made in the hearings were ultimately incorporated into law as part of the 1992 Amendments to the OAA (P.L. 102-375).

Specifically, the 1992 Amendments stipulated that ENP meals must comply with the *Dietary Guidelines for Americans* (DGAs) and provide the following:

- A minimum of one-third of the Recommended Dietary Allowances (RDAs) if one meal per day is offered.
- A minimum of two-thirds of the RDAs if two meals per day are offered.
- 100 percent of the RDAs if three meals per day are offered.

These standards represent a substantial change from previous practice. Before 1992, some States encouraged ENP sites to consider the DGAs, but neither Federal nor State guidelines required that ENP meals be consistent with the DGAs. With regard to the RDA standards, the 1992 regulations shifted the focus from the individual meal to the total meal package. Previous regulations required that *each meal* supply one-third of the RDA, regardless of the type of meal or the total number of meals offered. The switch to standards that considered the total meal package provided more flexibility in meal planning because it allowed program planners to distribute nutrients across multiple meals as long as the total combination of meals offered provided participants with the opportunity to consume specified levels of nutrients.

Research Overview

No one has studied the effectiveness of the NSIP (or the former NPE), per se. To understand the impact of the NSIP, one has to look to research on the larger program, the ENP. The literature search identified two nationally representative studies of the ENP as well as 11 smaller local studies.¹³⁶ Characteristics of these studies are summarized in table 41. Studies are divided into three groups. Group I includes national evaluations, Group IIA includes local studies that focused on congregate ENP programs, and Group IIB includes local studies that examined the home-delivered meals component of the ENP.

The first national evaluation of the ENP was conducted for the AoA by Kirschner Associates, Inc., and

¹³⁶Studies that assessed the nutrient content of ENP meals and/or the contribution of ENP meals to the nutrient intake of participants—without comparison to nonparticipants—are not included in table 41 or the summary tables presented later in this section, but have contributed to this review. These sources include Stevens et al. (1992), Vaughan and Manore (1988), Grandjean et al. (1981), Caliendo and Smith (1981), Caliendo (1980), and Caliendo and Batcher (1980).

Opinion Research Corporation (ORC). The study was done in two waves, with data collected in 1976-77 (reported in 1979) and in 1982 (reported in 1983). In this partially longitudinal design, 42 percent of wave I participants were re-interviewed in wave II.

The most recent national evaluation, the National Evaluation of the Elderly Nutrition Program, 1993-95, is the most comprehensive evaluation of the ENP completed to date (Ponza et al., 1996). The evaluation focused largely on dietary intake, although the social support aspect of the program was also assessed. ENP participants were compared with the elderly U.S. population in general, using data from the third National Health and Nutrition Examination Survey (NHANES-III), as well as with eligible nonparticipants, identified through Medicare beneficiary data.

Of the 11 local studies that attempted to measure the impact of ENP participation on nutrition and health outcomes, 8 (Group IIA in table 41) looked at congregate meals and 3 (Group IIB) looked at home-delivered meals. Sample sizes for all of these studies were substantially smaller than those of the nationally representative studies. Four studies had samples of less than 100 (Gilbride et al., 1998; Steele and Bryan, 1986; LeClerc and Thornbury, 1983; Singleton et al., 1980). Samples for the remaining seven studies ranged from 135 to 547.

Identifying Nonparticipant Comparison Groups

All of the impact studies completed to date have used quasi-experimental designs. Most studies compared program participants with a similar group of eligible nonparticipants at a single point in time. Nearly all of the studies defined program participants as those who ate an ENP meal during the preceding 24-hour period.

Researchers have used several different methods to identify nonparticipant comparison groups and have had varying degrees of success in establishing comparability between groups. Many of the local studies identified nonparticipants from program waiting lists. While this approach may seem like a reasonable way to minimize potential selection bias, it may lead to problems with the comparability of treatment and control groups. Not all ENP sites, particularly those that serve congregate meals, have waiting lists. Sites that do have waiting lists and the individuals included on those lists may differ from sites that do not have waiting lists and the individuals who participate in those sites. Moreover, individuals on waiting lists may be different from those receiving

Table 41—Studies that examined the impact of the Elderly Nutrition Program on nutrition and health outcomes

Study	Outcome(s)	Data sources ¹	Data collection method	Population (sample size)	Design	Measure of participation	Analysis method
Group I: National evaluations							
Ponza et al. (1996) (National Evaluation of the ENP—1993-95)	Dietary intake and social contacts	Random sample of ENP participants (both congregate and home-delivered) and random sample of nonparticipants selected from HCFA Medicare beneficiary file (1993-95)	24-hour dietary recall and in-person interview	ENP-eligible elderly (n=2,699)	Participant vs. nonparticipant	Received ENP meal on dietary recall day (did not necessarily consume it)	Multivariate regression; attempted to control for selection bias
Kirschner and Associates and Opinion Research Corporation - Wave II (1983)	Dietary intake and socialization	Participants in 70 randomly selected ENP sites (both congregate and home-delivered), random sample of participants' neighbors, and former participants (1976-77)	24-hour dietary recall and isolation index	ENP-eligible elderly (n=3,411)	Participant vs. nonparticipant and comparisons to Wave I participants still enrolled in congregate sites	Ate ENP meal on dietary recall day	Chi-square tests
Kirschner and Associates and Opinion Research Corporation - Wave I (1979)	Dietary intake and socialization	Participants in 91 randomly selected ENP sites (congregate only) and random sample of participants' neighbors (1982)	24-hour dietary recall and isolation index	ENP-eligible elderly (n=4,563)	Participant vs. nonparticipant	Ate ENP meal on dietary recall day	No statistical tests conducted
Group IIA: State and local studies of congregate meals							
Gilbride et al. (1998)	Dietary intake and nutritional risk	Residents in HUD elderly housing facilities in metropolitan New York City; nonparticipants from facilities that did not have ENP (dates not reported)	2 24-hour dietary recalls, food frequency, 5-day food records, and level-one screen from Nutrition Screening Initiative checklist	ENP-eligible elderly (n=40)	Participant vs. nonparticipant	Currently receiving ENP meals	No statistical tests conducted

See notes at end of table.

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Table 41—Studies that examined the impact of the Elderly Nutrition Program on nutrition and health outcomes—Continued

Study	Outcome(s)	Data sources ¹	Data collection method	Population (sample size)	Design	Measure of participation	Analysis method
Neyman et al. (1996)	Dietary intake, weight status, nutritional biochemistries	Participants and nonparticipants at 9 ENP sites in 2 northern California counties (dates not reported)	3-day food record, venous blood sample, height and weight	ENP-eligible elderly (n=135)	Participant vs. nonparticipant	Ate ENP meal on at least 1 food record day	Multifactorial analysis of variance
Czajka-Narins et al. (1987)	Dietary intake, weight status, and nutritional biochemistries	Participants in 6 ENP sites in Missouri; nonparticipants from senior center that did not serve meals (dates not reported)	1-day food record, 24-hour recall, food frequency, venous blood sample, height, weight, and tricep skinfolds	ENP-eligible elderly, over 75 years old (n=185)	Participant vs. nonparticipant	Regular participation: Ate at ENP meal site 2-5 times per week Irregular participation: Ate at ENP site less than twice per week, but at least once per week during last 4 months	Chi-square tests and analysis of variance
LeClerc and Thornbury (1983)	Dietary intake	Participants in 1 ENP site in central Maine; nonparticipants from federally-subsidized housing units in same area (dates not reported)	3-day food records	ENP-eligible, low-income elderly (n=53)	Participant vs. nonparticipant	Ate ENP meal 3-5 times per week	Bivariate t-tests and analysis of variance
Nordstrom et al. (1982)	Iron intake and iron status	Participants in 6 ENP sites in Missouri; nonparticipants from senior center that did not serve meals (1975)	1-day food record and venous blood sample	ENP-eligible elderly (n=320)	Participant vs. nonparticipant	Ate ENP meal on food record day	Analysis of variance

See notes at end of table.

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Table 41—Studies that examined the impact of the Elderly Nutrition Program on nutrition and health outcomes—Continued

Study	Outcome(s)	Data sources ¹	Data collection method	Population (sample size)	Design	Measure of participation	Analysis method
Kohrs et al. (1980)	Dietary intake, weight status, and nutritional biochemistries	Participants in 6 ENP sites in Missouri; nonparticipants from senior center that did not serve meals (1975)	1-day food record, 24-hour recall, food frequency, venous blood sample, height, weight, and tricep skinfolds	ENP-eligible elderly (n=547)	Participant vs. nonparticipant	Regular participation: Ate at ENP meal site 2-5 times per week Irregular participation: Ate at ENP site less than twice per week, but at least once per week during last 4 months	Chi-square tests and analysis of variance
Singleton et al. (1980)	Dietary intake	Participants in 7 ENP sites in southern Louisiana; nonparticipants from 2 senior centers that did not serve meals (dates not reported)	24-hour dietary recall	ENP-eligible, low-income elderly females (n=97)	Participant vs. nonparticipant	Ate ENP meal on dietary recall day	Analysis of variance
Kohrs et al. (1978)	Dietary intake	Participants in 6 ENP sites in Missouri; nonparticipants from senior center that did not serve meals (1973)	1-day food record	ENP-eligible elderly (n=466)	Participant vs. nonparticipant	Ate ENP meal on food record day	Analysis of variance
Group IIB: State and local studies of home-delivered meals							
Edwards et al. (1998)	Food security, diet diversity, and diabetic control	Random sample of diabetic recipients of home-delivered meals in New York State and random sample of non-participants from a waiting list (1986-87)	In-person interview and mail survey of respondents' physicians	ENP-eligible, homebound diabetic elderly (n=154)	Participant vs. nonparticipant	Currently receiving ENP meals at least 2 times per week	Multivariate regression

See notes at end of table.

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Table 41—Studies that examined the impact of the Elderly Nutrition Program on nutrition and health outcomes—Continued

Study	Outcome(s)	Data sources ¹	Data collection method	Population (sample size)	Design	Measure of participation	Analysis method
Ho-Sang (1989)	Dietary intake and weight status	Recipients of home-delivered meals in New York State; nonparticipants from waiting lists for other programs (dates not reported)	24-hour dietary recall, height, weight, and tricep skinfolds	ENP-eligible, homebound elderly (n=448)	Participant vs. nonparticipant	Currently receiving ENP meals	Bivariate t-tests and multivariate regression
Steele and Bryan (1986)	Dietary intake	Recipients of home-delivered meals from 1 site in North Carolina; nonparticipants from a waiting list (1982-83)	24-hour dietary recall and diet history	ENP-eligible, homebound elderly (n=54)	Participant vs. nonparticipant	Currently receiving 1 ENP meal per day, 5 days per week	Bivariate t-tests

¹ All studies were primary data collection efforts.

meals because of the criteria sites use to determine who gets on the list and, once on the list, who gets served first (Ponza et al., 1996).

Neither of the national evaluations of the ENP used waiting lists to define comparison groups. The Kirschner/ORC study (1979, 1983) drew nonparticipants from neighbors of participants and former participants. The 1993-95 National Evaluation of the ENP (Ponza et al., 1996) used Medicare beneficiary files to identify eligible nonparticipants and then contacted them by telephone to screen for age, income, disability status, and program participation.

Outcomes Examined

The nutrition- and health-related outcome most often examined in this literature is dietary intake. Only a few studies, all of which were local studies, examined nutritional biochemistries or weight status (Neyman et al., 1996; Ho-Sang, 1989; Czajka-Narins et al., 1987; Nordstrom et al., 1982; Kohrs et al., 1980). The two most recent studies (Ponza et al., 1996; Gilbride et al., 1998) included a general measure of nutritional risk. However, only Gilbride et al. (1998) compared participants and nonparticipants on this measure and no statistical tests were conducted. One study examined the impact of the ENP on food security (Edwards et al., 1993). And finally, the two national evaluations (Kirschner/ORC, 1979, 1983; Ponza et al., 1996) included assessment of social interaction.

Limitations

Many of the identified studies included only simple bivariate comparisons of participant and nonparticipant groups. Although most authors attempted to demonstrate comparability of participant and nonparticipant groups on “key” variables, the lack of more sophisticated analytical controls for noncomparability substantially limits the credibility of study findings.

Most of the more recent studies (for example, Edwards et al., 1998; Ponza et al., 1996; Ho-Sang, 1989) used multivariate regression techniques to control for differences in measured characteristics. However, only the 1993-95 National Evaluation of the ENP attempted to address potential selection bias through statistical modeling. Ponza and his colleagues (1996) estimated three selection-bias models but ultimately considered the results unreliable. They based their findings on regression-adjusted comparisons from a one-stage model, appropriately cautioning readers that selection bias may play a role in reported results.

Research Results

This section summarizes findings from the available research. The discussion is organized into six sections, each of which focuses on reported effects of the ENP on a different outcome or group of outcomes. The outcomes examined include intake of food energy and nutrients, nutritional biochemistries, weight status, socialization, food security, and nutritional risk.

All of the studies that compared the nutrient content of ENP with the minimum Federal requirement of one-third of the RDA (per meal) found that ENP meals served to participants satisfied this standard (Ponza et al., 1996; Stevens et al., 1992; Kohrs, 1986; Kirschner/ORC, 1983; Caliendo, 1980; and Kohrs et al., 1978). Thus, one can assume that participants generally had access to the nutritional benefit the ENP was designed to deliver.

Impacts on Intake of Food Energy and Nutrients

Most studies that examined dietary outcomes used a single 24-hour recall. Comparisons between participants and nonparticipants were based on mean intakes, most often expressed as proportions of the RDAs.

In addition to the usual problems with 24-hour recall data and comparisons to RDA benchmarks (see chapter 2), use of the RDA in assessing intakes of elderly persons presents unique problems (Dwyer and Mayer, 1997; Ponza et al., 1996; Ponza et al., 1994; Posner, 1979). The RDAs, as they existed at the time the reviewed research was conducted, provided a single recommendation for all males over the age of 51 and a corresponding recommendation for all females over the age of 51 (National Research Council (NRC), 1989). There is good evidence, however, that nutrient needs actually differ for adults over the age of 60 or 70 (Russell and Suter, 1993). In addition, physiologic changes associated with aging, degenerative changes related to chronic disease, and/or pharmacologic or other interventions can influence nutrient absorption, use, or excretion among the elderly (Ponza et al., 1994). Consequently, the available information on the impact of the ENP on participants' intake of food energy and nutrients must be considered even more tentative than the information available for most other food assistance and nutrition programs (FANPs).¹³⁷

¹³⁷The Dietary Reference Intakes (DRIs) which have replaced the traditional RDAs (see chapter 2), define separate standards for adults between the ages of 51 and 70 and those over the age of 70.

Findings for all studies that examined the impact of the ENP on the dietary intake of older adults are summarized in table 42. The table is divided into four sections: food energy and macronutrients, vitamins, minerals, and other dietary components. The table clearly illustrates whether findings apply to congregate meals, home-delivered meals, or both types of meals. The text follows the same general organization as table 42, but findings related to vitamins and minerals are discussed in one section.

In the interest of providing a comprehensive picture of the body of research, both significant and nonsignificant results are reported in table 42 and in all other “findings” tables. 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, however, 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.

In interpreting available data on the impact of the ENP on the dietary intake of older adults, findings from the 1993-95 National Evaluation of the ENP (Ponza et al., 1996) are given the most weight. Despite a lingering potential for selection bias, this study provides the best available information on potential nutrition- and health-related impacts of the ENP. The study, which was national in scope and is the most comprehensive study done to date, was implemented with great care and is based on relatively recent data. Most importantly, the study used appropriate analytic techniques to control for between-group differences in measured characteristics rather than relying on unadjusted bivariate comparisons. Study authors were also careful to avoid estimating impacts on outcomes that are particularly vulnerable to selection bias, such as food security (food-insecure individuals may seek out the ENP) and measures of nutritional status beyond intake of energy and nutrients from ENP meals (ENP sites target the most vulnerable elderly).

Food Energy and Macronutrients

In the 1993-95 National Evaluation of the ENP, Ponza et al. (1996) found that both congregate and home-delivered ENP participants had significantly higher energy intakes than nonparticipants. Comparable results were reported in the other national study that looked at energy intake (Kirschner/ORC, 1983), as well as in one local study (Kohrs, et al., 1978).

Findings from the remaining studies that included statistical analyses were inconsistent, and none of the differences between participants and nonparticipants were statistically significant. Most of these studies had very small samples and relied on bivariate analyses.

The 1993-95 National Evaluation of the ENP also found that ENP participants consumed a significantly greater amount of protein than nonparticipants. However, the difference between participants and nonparticipants in the percentage of calories derived from protein was not significant (participants consumed more energy *and* more protein).

Data from national surveys of food and nutrient intake indicate that older Americans, like their younger counterparts, typically exceed recommended intakes of both total fat and saturated fat, expressed as a percentage of total energy intake (Dwyer and Mayer, 1997). The ENP does not appear to influence this situation one way or the other, despite the previously described changes in program regulations that incorporated the DGAs into the program’s nutrition standards. Neither of the studies that were completed after 1992 (when the DGAs were incorporated) and included statistical analyses found significant differences between ENP participants and nonparticipants in the intake of fat or saturated fat, relative to energy intake (Ponza et al., 1996; Neyman et al., 1996). These findings were true whether ENP meal(s) were consumed in congregate sites or at home. Findings from older studies (conducted before the 1992 policy change) are similar.

Vitamins and Minerals

Both of the national evaluations found that ENP participants consumed significantly greater amounts of a wide array of vitamins and minerals than nonparticipants. The earliest national evaluation (Kirschner/ORC, 1983) reported that ENP participants consumed significantly more than nonparticipants of all of the vitamins and minerals examined: vitamin A, vitamin C, niacin, riboflavin, thiamin, calcium, and iron. The more recent 1993-95 National Evaluation of the ENP (Ponza et al., 1996) reported the same pattern of findings for ENP participants who received congregate meals. ENP participants who received home-delivered meals also had higher mean intakes than nonparticipants, but some of these differences did not reach statistical significance. In addition, the 1993-95 National Evaluation found higher intakes among ENP participants for a number of vitamins and minerals that were not measured in the earlier study: vitamins B₆, B₁₂, D, and E, folate, magnesium, phosphorus, potassium, and zinc.

Table 42—Findings from studies that examined the impact of the Elderly Nutrition Program on participants' dietary intakes

Outcome	Significant impact		No significant impact	
	Participants consumed more	Participants consumed more/same	Participants consumed less	Participants consumed less
Food energy and macronutrients				
Food energy	<p>Both meal types Ponza (1996) [national] Kirschner (1983) [national]</p> <p>Congregate only Kohrs (1978) [6 sites]</p>	<p>Congregate only Czajka-Narins (1987) [6 sites] LeClerc (1983) [1 site] Kohrs (1980) [6 sites] Singleton (1980) [7 sites] Kirschner (1979) [national]</p>	<p>Congregate only Gilbride (1998) [3 sites] Neyman (1996) [9 sites]</p> <p>Home only Steele (1986) [1 site]</p>	
Protein	<p>Both meal types Ponza (1996) [national]¹ Kirschner (1983) [national]</p> <p>Congregate only Czajka-Narins (1987) [6 sites] Kohrs (1978) [6 sites]</p>	<p>Congregate only LeClerc (1983) [1 site] Kirschner (1979) [national]</p> <p>Home only Ho-Sang (1989) [6 sites] Steele (1986) [1 site]</p>	<p>Congregate only Gilbride (1998) [3 sites] Neyman (1996) [9 sites] Kohrs (1980) [6 sites] Singleton (1980) [7 sites]</p>	
Carbohydrates		<p>Both meal types Ponza (1996) [national]</p> <p>Congregate only Neyman (1996) [9 sites] Czajka-Narins (1987) [6 sites] LeClerc (1983) [1 site] Kohrs (1980) [6 sites] Singleton (1980) [7 sites]</p>	<p>Congregate only Gilbride (1998) [3 sites]</p> <p>Home only Ho-Sang (1989) [6 sites]</p>	<p>Home only Steele (1986) [1 site]</p>
Fat		<p>Congregate only Gilbride (1998) [3 sites] Neyman (1996) [9 sites] Kohrs (1980) [6 sites]</p> <p>Home only Ponza (1996) [national] Ho-Sang (1989) [6 sites]</p>	<p>Congregate only Ponza (1996) [national] Czajka-Narins (1987) [6 sites] LeClerc (1983) [1 site] Singleton (1980) [7 sites]</p> <p>Home only Steele (1986) [1 site]</p>	

See notes at end of table.

Continued—

Table 42—Findings from studies that examined the impact of the Elderly Nutrition Program on participants' dietary intakes—Continued

Outcome	Significant impact	No significant impact		Significant impact
	Participants consumed more	Participants consumed more/same	Participants consumed less	Participants consumed less
Saturated fat			<p>Both meal types Ponza (1996) [national]</p> <p>Congregate only Czajka-Narins (1987) [6 sites] Kohrs (1980) [6 sites]</p>	
Vitamins				
Vitamin A	<p>Both meal types Ponza (1996) [national] Kirschner (1983) [national]</p> <p>Congregate only Singleton (1980) [7 sites]</p>	<p>Congregate only Neyman (1996) [9 sites] {females} Czajka-Narins (1987) [6 sites] LeClerc (1983) [1 site] Kohrs (1980) [6 sites] Kirschner (1979) [national]</p> <p>Home only Ho-Sang (1989) [6 sites]</p>	<p>Congregate only Gilbride (1998) [3 sites] Neyman (1996) [9 sites] {males} Kohrs (1978) [6 sites]</p> <p>Home only Steele (1986) [1 site]</p>	
Vitamin B ₆	<p>Both meal types Ponza (1996) [national]</p>	<p>Congregate only Singleton (1980) [7 sites]</p>	<p>Congregate only Neyman (1996) [9 sites]</p>	
Vitamin B ₁₂	<p>Home only Ponza (1996) [national]</p>	<p>Congregate only Neyman (1996) [9 sites] {females} Ponza (1996) [national] Singleton (1980) [7 sites]</p>		<p>Congregate only Neyman (1996) [9 sites] {males}</p>

See notes at end of table.

Continued—

Table 42—Findings from studies that examined the impact of the Elderly Nutrition Program on participants' dietary intakes—Continued

Outcome	Significant impact	No significant impact		Significant impact
	Participants consumed more	Participants consumed more/same	Participants consumed less	Participants consumed less
Vitamin C	<p>Both meal types Kirschner (1983) [national]</p> <p>Congregate only Ponza (1996) [national]</p>	<p>Congregate only Neyman (1996) [9 sites] Czajka-Narins (1987) [6 sites] Kohrs (1980) [6 sites] Kirschner (1979) [national] Kohrs (1978) [6 sites]</p> <p>Home only Ponza (1996) [national]</p>	<p>Congregate only Gilbride (1998) [3 sites] LeClerc (1983) [1 site] Singleton (1980) [7 sites]</p> <p>Home only Ho-Sang (1989) [6 sites] Steele (1986) [1 site]</p>	
Vitamin D	<p>Both meal types Ponza (1996) [national]</p>	<p>Home only Ho-Sang (1989) [6 sites]</p>	<p>Congregate only Gilbride (1998) [3 sites]</p>	
Vitamin E	<p>Congregate only Ponza (1996) [national]</p>	<p>Congregate only Gilbride (1998) [3 sites] Singleton (1980) [7 sites]</p> <p>Home only Ponza (1996) [national]</p>	<p>Congregate only Neyman (1996) [9 sites]</p>	
Folate	<p>Both meal types Ponza (1996) [national]</p>	<p>Congregate only Neyman (1996) [9 sites]</p> <p>Home only Ho-Sang (1989) [6 sites]</p>	<p>Congregate only Gilbride (1998) [3 sites]</p>	
Niacin	<p>Both meal types Kirschner (1983) [national]</p> <p>Congregate only Ponza (1996) [national] Czajka-Narins (1987) [6 sites] Kohrs (1978) [6 sites]</p>	<p>Congregate only Neyman (1996) [9 sites] {males} Kohrs (1980) [6 sites] {females} Kirschner (1979) [national]</p> <p>Home only Ponza (1996) [national] Steele (1986) [1 site]</p>	<p>Congregate only Neyman (1996) [9 sites] {females} LeClerc (1983) [1 site] Kohrs (1980) [6 sites] {males} Singleton (1980) [7 sites]</p>	

See notes at end of table.

Continued—

Table 42—Findings from studies that examined the impact of the Elderly Nutrition Program on participants' dietary intakes—Continued

Outcome	Significant impact	No significant impact		Significant impact
	Participants consumed more	Participants consumed more/same	Participants consumed less	Participants consumed less
Riboflavin	<p>Both meal types Ponza (1996) [national] Kirschner (1983) [national]</p> <p>Congregate only Kohrs (1978) [6 sites]</p>	<p>Congregate only Czajka-Narins (1987) [6 sites] LeClerc (1983) [1 site] Kohrs (1980) [6 sites] Singleton (1980) [7 sites] Kirschner (1979) [national]</p> <p>Home only Ho-Sang (1989) [6 sites]</p>	<p>Congregate only Neyman (1996) [9 sites]</p> <p>Home only Steele (1986) [1 site]</p>	
Thiamin	<p>Both meal types Kirschner (1983) [national]</p> <p>Congregate only Ponza (1996) [national]</p>	<p>Congregate only Czajka-Narins (1987) [6 sites] {irregular participation} LeClerc (1983) [1 site] Kohrs (1980) [6 sites] Kirschner (1979) [national]</p> <p>Home only Ponza (1996) [national] Ho-Sang (1989) [6 sites]</p>	<p>Congregate only Neyman (1996) [9 sites] Czajka-Narins (1987) [6 sites] {regular participation} Singleton (1980) [7 sites] Kohrs (1978) [6 sites]</p>	<p>Home only Steele (1986) [1 site]</p>
Minerals				
Calcium	<p>Both meal types Ponza (1996) [national] Kirschner (1983) [national]</p> <p>Congregate only Czajka-Narins (1987) [6 sites] Kohrs (1978) [6 sites]</p>	<p>Congregate only LeClerc (1983) [1 site] Kohrs (1980) [6 sites] Singleton (1980) [7 sites] Kirschner (1979) [national]</p> <p>Home only Ho-Sang (1989) [6 sites]</p>	<p>Congregate only Gilbride (1998) [3 sites] Neyman (1996) [9 sites]</p> <p>Home only Steele (1986) [1 site]</p>	
Copper			<p>Congregate only Neyman (1996) [9 sites] {females}</p>	<p>Congregate only Neyman (1996) [9 sites] {males}</p>

See notes at end of table.

Continued—

Table 42—Findings from studies that examined the impact of the Elderly Nutrition Program on participants' dietary intakes—Continued

Outcome	Significant impact	No significant impact		Significant impact
	Participants consumed more	Participants consumed more/same	Participants consumed less	Participants consumed less
Iron	Both meal types Kirschner (1983) [national]	Both meal types Ponza (1996) [national] Congregate only Czajka-Narins (1987) [6 sites] {irregular participation} LeClerc (1983) [1 site] Kohrs (1980) [6 sites] {females} Singleton (1980) [7 sites] Kirschner (1979) [national] Home only Ho-Sang (1989) [6 sites]	Congregate only Gilbride (1998) [3 sites] Neyman (1996) [9 sites] Czajka-Narins (1987) [6 sites] {regular participation} Kohrs (1980) [6 sites] {males}	Congregate only Nordstrom (1982) [6 sites] Kohrs (1978) [6 sites] Home only Steele (1986) [1 site]
Magnesium	Both meal types Ponza (1996) [national]		Congregate only Gilbride (1998) [3 sites] Neyman (1996) [9 sites]	
Phosphorus	Both meal types Ponza (1996) [national]	Congregate only Singleton (1980) [7 sites]	Congregate only Gilbride (1998) [3 sites] Neyman (1996) [9 sites] {females} Home only Steele (1986) [1 site]	Congregate only Neyman (1996) [9 sites] {males}
Potassium	Both meal types Ponza (1996) [national]	Home only Ho-Sang (1989) [6 sites]	Home only Steele (1986) [1 site]	
Selenium			Congregate only Neyman (1996) [9 sites] {males}	Congregate only Neyman (1996) [9 sites] {females}
Zinc	Both meal types Ponza (1996) [national]		Congregate only Gilbride (1998) [3 sites] Neyman (1996) [9 sites]	

See notes at end of table.

Continued—

Table 42—Findings from studies that examined the impact of the Elderly Nutrition Program on participants' dietary intakes—Continued

Outcome	Significant impact		No significant impact	
	Participants consumed more	Participants consumed more/same	Participants consumed less	Participants consumed less
Other dietary components				
Cholesterol		Both meal types Ponza (1996) [national] Congregate only Gilbride (1998) [3 sites] ¹ Neyman (1996) [9 sites]	Congregate only Czajka-Narins (1987) [6 sites] Kohrs (1980) [6 sites] Home only Ho-Sang (1989) [6 sites] Steele (1986) [1 site]	
Fiber			Congregate only Neyman (1996) [9 sites]	
Sodium		Home only Ho-Sang (1989) [6 sites] Steele (1986) [1 site]	Both meal types Ponza (1996) [national] Home only Steele (1986) [1 site]	

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). Where study findings pertain only to a specific subgroup, the cell entry also identifies the subgroup (in brackets).

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.

Neither Gilbride et al. (1998) nor Kirschner/ORC (1979) included tests of statistical significance.

¹Significant results for absolute value only (gm per day). As a percentage of food energy, there was no difference between groups.

In general, the smaller studies did not find significant differences between ENP participants and nonparticipants in vitamins and minerals. As illustrated in table 42, significant differences that were reported included findings that were consistent with the large, national studies (ENP participants consumed more nutrients), and some that were inconsistent (ENP participants consumed fewer nutrients).

Other Dietary Components

The 1993-95 National Evaluation of the ENP found no significant difference between cholesterol intakes of ENP participants and nonparticipants. This finding was true for both congregate and home-delivered ENP participants. Mean cholesterol intakes of all groups were well within the recommended range.

Similarly, the 1993-95 National Evaluation found no significant difference between ENP participants (congregate or home-delivered) and nonparticipants in mean sodium intake. However, the researchers did point out that excessive sodium intake may be a problem for some ENP participants. The average intake of sodium among congregate-meal participants exceeded the recommended maximum. Moreover, both types of ENP participants received more than one-third of the recommended daily maximum for sodium through program meals.

Only one small, local study examined intake of dietary fiber (Neyman et al., 1996). The authors found that participants in congregate ENP sites consumed less fiber than eligible nonparticipants, but the difference was not statistically significant.

Impacts on Nutritional Biochemistries

Four of the small, local studies attempted to assess the impact of the ENP on selected nutritional biochemistries (Neyman, et al., 1996; Czajka-Narins et al., 1987; Nordstrom et al., 1982; Kohrs et al., 1980). All of these studies were limited to congregate feeding sites.

Findings from these studies, summarized in table 43, must be interpreted with caution. None of the researchers attempted to control for selection bias or used analytic techniques to control for measured differences in characteristics of participants and nonparticipants. The fact that the ENP specifically targets individuals with nutritional risks may account for the “negative” findings reported by Czajka-Narins et al. (1987) and Neyman et al. (1996).

All four studies examined iron status using mean levels of hematocrit, hemoglobin, and/or serum iron. Findings for Nordstrom et al. (1982) are summarized

in a footnote in table 43. Data could not be included in the table because authors did not report point estimates. Two of the four studies reported significant differences between ENP participants and nonparticipants on one or more measures of iron status for specific subgroups of the population. The pattern of findings was not consistent, however, and there were more “negative” than “positive” differences.

Three of the four studies evaluated serum albumin levels. Serum albumin is used as an indicator of malnutrition (inadequate protein intake) among the elderly. All three studies found that mean serum albumin levels were within the normal range and that the prevalence of less-than-acceptable values did not differ by participation status. However, analyses that compared mean serum albumin values by age and gender found some statistically significant differences between participants and nonparticipants. Neyman et al. (1996) found that male ENP participants had significantly higher serum albumin levels than male nonparticipants. Czajka-Narins et al. (1987) found that the opposite was true for females over 75 who participated in the ENP two or more times per week.

The same three studies examined serum levels of vitamin A, a long-term measure of nutrient intake. Studies by Czajka-Narins et al. (1987) and Kohrs et al. (1980) found that ENP participants had significantly higher levels of serum vitamin A, on average, than did nonparticipants. Note that both of these studies reported that ENP participants consumed more vitamin A than nonparticipants, but the differences were not statistically significant (table 42). Kohrs and associates (1980) also found that ENP participants were significantly less likely than nonparticipants to have an abnormally low level of serum vitamin A.

Limited intake of vitamin A among the elderly had been reported by several investigators (Kim et al., 1993; Kirschner/ORC, 1983; LeClerc and Thornbury, 1983;). Kohrs (1982) emphasizes that “almost one-half of ENP nonparticipants are at risk for vitamin A deficiency” and that improvement in vitamin A status appears to be one of the most important benefits of the ENP.

Kohrs et al. (1980) and Czajka-Narins et al. (1987) also looked at serum levels of vitamin C, which are affected by short-term (rather than long-term) dietary intake. Neither study found a significant difference in mean levels of serum vitamin C. However, Kohrs et al. (1980) found that ENP participants were significantly

Table 43—Findings from studies that examined the impact of the Elderly Nutrition Program on biochemical indicators of nutritional status

Outcome	No significant impact		Significant impact
	Participants higher	Participants higher/same	Participants lower
Hematocrit ¹		Neyman (1996) [9 sites] ² Czajka-Narins (1987) [6 sites] {males; regular participants} ² Kohrs (1980) [6 sites] {males} ²	Czajka-Narins (1987) [6 sites] {females} Kohrs (1980) [6 sites] {females} ² Czajka-Narins (1987) [6 sites] {males; irregular participants}
Hemoglobin ¹	Neyman (1996) [9 sites] {females} ²	Czajka-Narins (1987) [6 sites] {males; regular participants} ² Kohrs (1980) [6 sites] {males} ²	Neyman (1996) [9 sites] {males} ² Czajka-Narins (1987) [6 sites] {females} Kohrs (1980) [6 sites] {females} ² Czajka-Narins (1987) [6 sites] {males; irregular participants}
Serum iron ¹			Neyman (1996) [9 sites] {males} ² Czajka-Narins (1987) [6 sites] Kohrs (1980) [6 sites] ² Neyman (1996) [9 sites] {females} ²
Albumin	Neyman (1996) [9 sites] {males} ²	Neyman (1996) [9 sites] {females} ² Czajka-Narins (1987) [6 sites] {males} Kohrs (1980) [6 sites] {males} ²	Kohrs (1980) [6 sites] {females} ² Czajka-Narins (1987) [6 sites] {females; regular participants}
Total protein	Czajka-Narins (1987) [6 sites] {females; irregular participants}	Czajka-Narins (1987) [6 sites] {males}	
Vitamin A	Czajka-Narins (1987) {females} ⁴ Kohrs (1980) [6 sites] ⁴	Czajka-Narins (1987) [6 sites] {males} Neyman (1996) [9 sites] {females}	Neyman (1996) [9 sites] {males}
Vitamin C		Czajka-Narins (1987) [6 sites] {males} Kohrs (1980) [6 sites] ⁴	Czajka-Narins (1987) [6 sites] {females}
Vitamin E		Neyman (1996) [9 sites]	
Folate		Neyman (1996) [9 sites] {males}	Neyman (1996) [9 sites] {females}
Zinc			Neyman (1996) [9 sites]

See notes at end of table.

Continued—

Table 43—Findings from studies that examined the impact of the Elderly Nutrition Program on biochemical indicators of nutritional status—Continued

Outcome	Significant impact	No significant impact		Significant impact
	Participants higher	Participants higher/same	Participants lower	Participants lower
Cholesterol		Neyman (1996) [9 sites] {females} ²	Neyman (1996) [9 sites] {males} ¹ Czajka-Narins (1987) [6 sites] Kohrs (1980) [6 sites] ²	
HDL Cholesterol		Neyman (1996) [9 sites]		
LDL Cholesterol		Neyman (1996) [9 sites] {females}	Neyman (1996) [9 sites] {males}	
Triglycerides		Neyman (1996) [9 sites] {females}	Neyman (1996) [9 sites] {males}	

Notes: Cell entries show the senior author's name, the publication date, and the scope of the study (for example, national vs. 1 city or 1 State). Where study findings pertain only to a specific subgroup, the cell entry also identifies the subgroup {in brackets}.

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.

All findings are for congregate meal participants only and, unless otherwise noted, are based on mean values of the indicator.

¹ Nordstrom et al. (1982) looked at the impact of the ENP on iron status. They found no significant effect of participation on hematocrit, hemoglobin, serum iron, or mean cell hematocrit concentration, but did not report whether values were higher or lower for participants compared with nonparticipants.

² Authors also looked at percentage of individuals with abnormally low values and found no significant differences between participants and nonparticipants.

³ As shown in Table 3 of their report. Report text, however, describes the opposite finding (i.e., a significant positive impact of ENP).

⁴ Authors also looked at percentage of individuals with abnormal values and found that, compared with nonparticipants, significantly fewer ENP participants had abnormally low values.

less likely than nonparticipants to have less-than-normal levels of serum vitamin C.

Neyman et al., 1996 examined blood levels of vitamin E, folate, and zinc but reported no significant differences between ENP participants and nonparticipants.

Finally, Neyman et al. (1996), Czajka-Narins et al. (1987), and Kohrs et al. (1980), looked at serum cholesterol levels. Neyman and associates (1996) also examined levels of HDL and LDL cholesterol and triglycerides. All of these studies reported that, although ENP participants tended to have lower cholesterol levels than nonparticipants, the differences between the two groups were not significant. This finding was true for both mean cholesterol levels and for the prevalence of elevated cholesterol levels. Neyman et al. (1996) found no significant effect on HDL cholesterol, LDL cholesterol, or triglycerides.

Impacts on Weight Status

Four local studies assessed the impact of the ENP on weight status (Neyman et al., 1996; Ho-Sang, 1989; Czajka-Narins et al., 1987; Kohrs et al., 1980). Findings from these studies, like those related to nutritional biochemistries, are subject to substantial concern about selection bias and must be interpreted with caution.

All four studies used data on height and weight to calculate indices of obesity and thinness, including body mass index (BMI),¹³⁸ ponderal index,¹³⁹ and the percentage of desirable weight (table 44). Tricep skinfold thickness was used to assess fatness as well as depletion of energy stores.

Kohrs and associates (1980) found that the prevalence of obesity was not significantly related to frequency of participation in the ENP, despite the fact that mean energy intake was greater among participants (table 42). In fact, there was an association (nonsignificant) between lower body weight (based on BMI, ponderal index, and percentage of desirable weight) and program participation. Czajka-Narins et al. (1987) found a comparable pattern among elders over age 75, with the association between ENP participation and lower body weight reaching statistical significance for males. In addition, Kohrs et al. (1980) found that, compared with female nonparticipants, a significantly greater percentage of female ENP participants were thin or wasted.

¹³⁸BMI = [Weight (kg)] / [Height (cm)²].

¹³⁹Ponderal index is calculated as height (in inches) divided by the cube root of weight (in pounds).

Being too thin is not desirable, particularly among the elderly. These findings suggest that thinner, and perhaps more frail elderly, may be self-selecting into the ENP (on their own volition or because they are targeted by the program). However, the available data are too limited to support a firm conclusion about the relationship between the ENP and the prevalence of thinness/wasting. It remains an interesting question for future research.

Impacts on Socialization

As noted in the introduction to this chapter, the ENP was intentionally designed to address the psychological and sociological needs of the elderly as well as their nutritional needs. The two national evaluations of the program are the only identified studies that attempted to systematically measure social outcomes of participants, relative to a group of eligible nonparticipants (Ponza et al., 1996; Kirschner/ORC, 1979, 1983). The studies employed two different measures, and results were divergent.

In the earliest national evaluation, Kirschner/ ORC (1979, 1983) classified respondents based on isolation using a five-point index: (1) living alone, (2) having too few friends, (3) having no one to confide in, (4) having children that do not visit, and (5) feeling lonely more often. Using multiple regression techniques, the authors found that “being extremely isolated” was significantly associated with use of ENP-sponsored shopping assistance.

The measure of socialization used in the 1993-95 National Evaluation (Ponza et al., 1996) was the number of social contacts per month. The authors found that ENP participants had significantly more social contacts per month than nonparticipants. As expected, the data also showed that homebound participants had less contact than those who attended congregate meal sites.

Impacts on Food Security

The issue of food security among ENP participants has not been well researched and the relationship is a complicated one. Evidence from a national survey of the elderly (Cohen et al., 1993) indicates that elderly FANP participants report higher levels of food insecurity than those who do not participate in FANPs. Those reporting participation in more than one FANP had the highest level of food insecurity. Elderly persons participating in two or more FANPs were more likely to have faced the choice between buying food and paying for medications than elderly persons participating in only one FANP. These patterns presumably do not

Table 44—Findings from studies that examined the impact of the Elderly Nutrition Program on participants' weight status

Outcome	Significant impact		No significant impact	
	Participants less obese/ more thin	Participants less obese/ more thin	Participants more obese/ less thin	Participants more obese/ less thin
Body mass index (BMI)	Congregate only Czajka-Narins (1987) [6 sites] {males} Kohrs (1980) [6 sites] {females} ¹	Congregate only Czajka-Narins (1987) [6 sites] {females} Kohrs (1980) [6 sites] {except subgroup noted} Home only Ho-Sang (1989) [6 sites] {New York City} ²	Congregate only Neyman (1996) [9 sites]	
Ponderal index	Congregate only Czajka-Narins (1987) [6 sites] {males} Kohrs (1980) [6 sites] {females} ¹	Congregate only Czajka-Narins (1987) [6 sites] {females} Kohrs (1980) [6 sites] {except subgroup noted}		
Percent of desirable weight	Congregate only Kohrs (1980) [6 sites] {females} ¹	Congregate only Kohrs (1980) [6 sites] {except subgroup noted}	Home only Ho-Sang (1989) [6 sites]	
Tricep skinfold thickness		Home only Ho-Sang (1989) [6 sites] {females; upstate New York} Ho-Sang (1989) [6 sites] {males; New York City}	Congregate only Czajka-Narins (1987) [6 sites] Kohrs (1980) [6 sites] Home only Ho-Sang (1989) [6 sites] {females; New York City } Ho-Sang (1989) [6 sites] {males; upstate New York}	

Notes: Cell entries show the senior author's name, the publication date, and the scope of the study (for example, national vs. 1 city or 1 State). Where study findings pertain only to a specific subgroup, the cell entry also identifies the subgroup {in brackets}.

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.

¹Unless otherwise noted, findings are based on mean values relative to norms for obesity (where they exist) and/or percentage of persons classified as obese.

¹Female ENP participants were more likely to be classified as thin than female nonparticipants.

²The author reports that, for the upstate New York subgroup, there were no significant differences between ENP participants and nonparticipants in height, weight, or BMI. However, data are not reported and no information is provided on the direction of differences between groups.

reflect an impact of FANP participation, but indicate that individuals who choose to participate in FANPs are more food-insecure than those who do not.

Only one of the identified studies attempted to assess the impact of ENP participation on food security (Edwards et al., 1993). The study focused on a very restricted sample of elderly diabetics who were either receiving home-delivered meals or were on a waiting list for home-delivered meals. Food-insecure individuals were defined as those who reported that they did not have enough money to purchase the foods they needed or had some other difficulty in obtaining food. In this context, the ENP was found to have a positive effect on food security. Elderly diabetics who were receiving home-delivered meals were less likely than comparable elders on a waiting list to be classified as food insecure or to go one or more days per month without food.

Ponza and his colleagues (1996) also assessed food security among ENP participants. Comparable data were not collected for nonparticipants, however. Instead, the authors compared findings for ENP participants with data for the U.S. elderly population overall. Food security was measured using a subset of four of the questions used in the Cohen et al. study (1993) (described earlier). Results indicated that, although most ENP participants reported having enough food to eat, they were much more likely to experience food insecurity than elderly persons in the overall U.S. population.

Impacts on Nutritional Risk

Assessing the nutritional status of elderly individuals is difficult because the factors that determine risk are complex and interdependent. Moreover, nutritional risk among the elderly is influenced by variables that are not considered for most other age groups, including socialization, physical functioning and mobility (frailty), and behavioral elements. To address this issue, the Nutrition Screening Initiative (NSI), a national collaborative effort of professional organizations committed to identifying and treating nutritional problems among the elderly, developed a two-tiered approach to screening for potential nutrition-related problems.¹⁴⁰

¹⁴⁰The NSI and associated nutrition screening tools are described in detail elsewhere (Gilbride et al., 1998; Ponza et al., 1996; Posner et al., 1993; Food Research and Action Center, 1987).

The Level 1 screen (table 45) is a simple checklist that can be completed largely by an elderly individual himself or herself, with some additional information obtained through an interview with a social service or health care provider. No laboratory tests or special measurements are required. The Level 2 nutrition screen encompasses a more in-depth assessment by a health professional, including measurement of anthropometric, biochemical, clinical, and dietary indicators of nutritional status as well as an assessment of functional status.

The Level 1 NSI screen is currently used in many ENP programs (Dwyer and Mayer, 1997) as a means of identifying individuals who might benefit from a specific nutrition-related service (for example, home-delivered meals, assistance with shopping or cooking, or nutrition education).¹⁴¹ Research has shown that the Level 1 screen reliably identified individuals at risk for nutrition-related problems (Posner, 1993). There is some concern, however, that the specificity of the measure is less than desirable; that is, it may produce too many “false positives” or overestimate the prevalence of significant nutritional risk (Dwyer and Mayer, 1997).

Using the Level 1 NSI screen on a small elderly population in New York City, Gilbride et al. (1998) found that the level of nutritional risk among congregate meal participants was twice that of a group of comparable elders who did not eat at congregate meal sites. The authors did not assess the statistical significance of this difference.

Ponza et al. (1996) used an approximation of the Level 1 NSI screen to assess nutritional risk among both congregate and home-delivered meal participants. Overall, 64 percent of congregate and 88 percent of home-delivered participants had characteristics associated with moderate to high nutrition risk. No comparisons were made to nonparticipants.

Most of the other published research related to the NSI and use of the NSI screen is descriptive research. However, the increasing use of NSI tools in ENP sites and in other social and health care service delivery sites may lead to outcomes-focused research.

¹⁴¹Key elements of the Level 1 screen have been incorporated into a simple self-assessment tool called the DETERMINE checklist. The DETERMINE checklist is also widely used in ENP delivery sites and by other groups and organizations working with older adults (Dwyer and Mayer, 1997).

Summary

Since the inception of the ENP, two national evaluations and a number of smaller local studies have attempted to assess the effectiveness of the program in meeting its goals. All of these studies used quasi-experimental designs (participant vs. nonparticipant), with nonparticipants identified in a variety of ways. Selection bias is a serious issue in all of this research. However, only the most recent national study (Ponza et al., 1996) addressed the problem systematically (although inconclusively). Moreover, much of the available research used unsatisfactory analysis techniques, presenting simple bivariate comparisons with no statistical controls for differences in measured characteristics of participants and nonparticipants.

By all accounts, the ENP is meeting its goal of providing low-cost, nutritionally sound meals to participating elders. Program meals comply with the *Dietary Guidelines for Americans* and most often far exceed the minimum of one-third of the RDA per meal as required by law.

The available research suggests that the ENP is providing elderly participants with more energy and nutrients than they might otherwise consume. The two national evaluations report increased consumption of food energy, protein, and a broad array of vitamins and minerals. The smaller studies generally did not find significant differences, which may be due to the general absence of analytical controls for pre-existing participant/non-participant differences as well as small sample sizes.

Table 45—Level 1 Nutrition Screen from the Nutrition Screening Initiative

If any one of the following is true, the individual may be at risk of poor nutritional status:

Body weight

Has lost 5 lb or 5% of body weight in 1 month
 Has lost or gained 10 lb or 10% of body weight in the past 6 months
 BMI <21¹
 BMI >28¹

Eating habits

Does not have enough food to eat each day
 Usually eats alone
 Does not eat anything on one or more days per month
 Has a poor appetite
 Is on a special diet
 Eats vegetables 2 or fewer times daily
 Consumes milk or milk products once or not at all daily
 Consumes fruit or fruit juice once or not all daily
 Eats breads, cereals, pasta, rice, or grains 5 or fewer times daily
 Has difficulty chewing or swallowing
 Has more than 1 alcoholic drink per day (if woman); more than 2 drinks per day (if man)
 Has pain in mouth, teeth, or gums

Living environment

Lives on an income of <\$6,000 per year per individual in the household
 Lives alone
 Is housebound
 Is concerned about home security
 Lives in a home with inadequate heating or cooling
 Does not have stove and/or refrigerator
 Is unable or prefers not to spend money on food (<\$25-\$30 per person per week spent on food)

Functional status

Usually or always needs assistance with any of the following:

Bathing	Eating	Traveling outside home
Dressing	Toileting	Preparing food
Grooming	Walking or moving about	Shopping for food or other necessities

¹BMI = Body Mass Index = [Weight (kg)] / [Height (cm)²].

Source: American Board of Family Practice Reference Guide for Geriatric Patients, "A Dietary Assessment—Table 5." (<http://www.familypractice.com/references/guidesframe.htm>). Accessed June 2003.

While all studies of the impact of the ENP are subject to selection bias, studies that looked at measures other than dietary intake (weight status, nutritional biochemistries, socialization, food security, and nutritional risk) are especially prone to this problem because the program specifically targets elders who are at nutritional or social risk. The limited information that is available suggests that ENP participation is not associated with obesity and that, in fact, thinner, more frail elderly may self-select into the program. With the possible exception of serum vitamin A, which was positively associated with participation in the ENP, drawing firm conclusions about the impact of the ENP on nutritional biochemistries is not possible.

Evidence of the ENP's impact on reducing social isolation and promoting quality of life among the elderly is mixed. While the perceived benefit of social and support services is quite high, only the two national evaluations attempted to systematically measure social outcomes of ENP participants, relative to a group of eligible non-participants. The two studies employed different measures of socialization and reported divergent results.

Only one study examined the impact of the ENP on food security. In a very restricted sample of elderly diabetics, the study found that ENP participants receiving home-delivered meals were less food-insecure than nonparticipants on a waiting list for home-delivered meals. On the other hand, Ponza et al. (1996) found

that, compared with the overall elderly U.S. population, ENP participants were much more likely to experience food insecurity.

Finally, one small study compared ENP participants and nonparticipants on a relatively simple, yet comprehensive, measure of nutritional risk. The authors report that the rate of nutritional risk among congregate ENP participants was twice that of nonparticipants. The research, however, used no statistical techniques to control for differences between groups or to assess the statistical significance of the observed difference.

The importance of the ENP as a component of the nutrition safety net will continue to increase in coming years as the population ages. Future research on the impacts of the ENP would benefit from a greater focus on impacts among the homebound who are most at risk for poor nutrition and health outcomes and represent an ever-increasing component of the program. In addition, given the focus of the program on social as well as nutritional needs, future research should include comprehensive assessment of the impact of the ENP on both food security and nutritional risk.

Most importantly, future research should emphasize longitudinal rather than cross-sectional designs. Although more costly, longitudinal studies would provide a firmer foundation for studying impacts beyond dietary intakes and for examining the influence of the ENP on seniors' nutrition status, health status, and quality of life over time (Roe, 1989; Posner, 1979).

References

- Balsam, A.L., A.F. Sullivan, B.E. Millen, and B.L. Rogers. 2000. "Service Innovations in the Elderly Nutrition Program: Two Decades of Accomplishments," *Journal of Nutrition for the Elderly* 19(4):41-48.
- Balsam, A.L., and B.L. Rogers. 1991. "Serving Elders in Greatest Social and Economic Need: The Challenge to the Elderly Nutrition Program," *Journal of Aging and Social Policy* 3(2):41-55.
- Caliendo, M.A. 1980. "Factors Influencing the Dietary Status of Participants in the National Nutrition Program for the Elderly. 1. Population Characteristics and Nutritional Intakes," *Journal of Nutrition for the Elderly* 1(1):23-39.
- Caliendo, M.A., and M. Batchner. 1980. "Factors Influencing the Dietary Status of Participants in the National Nutrition Program for the Elderly. 2. Relationships Between Dietary Quality, Program Participation, and Selected Variables," *Journal of Nutrition for the Elderly* 1(1):41-53.
- Caliendo, M.A., and J. Smith. 1981. "Preliminary Observations on the Dietary Status of Participants in the Title III-C Meal Program," *Journal of Nutrition for the Elderly* 1(3-4):21-39.
- Cohen, B.E., M.R. Burt, and M.M. Schulte. 1993. *Hunger and Food Insecurity Among the Elderly*. Washington, DC: Urban Institute.
- Czajka-Narins, D.M., M.B. Kohrs, J. Tsui, et al. 1987. "Nutritional and Biochemical Effects of Nutrition Programs in the Elderly," *Clinics in Geriatric Medicine* 3(2):275-87.
- Dwyer, J.T., and J. Mayer. 1997. *Update on Risks of Malnutrition in Older Americans: Perspectives from New Studies*. Bethesda, MD: National Aging Information Center.
- Edwards, D.L., E.A. Frongillo, Jr., B. Rauschenbach, et al. 1993. "Home-delivered Meals Benefit the Diabetic Elderly," *Journal of the American Dietetic Association* 93(5):585-87.
- Food Research and Action Center. 1987. *A National Survey of Nutritional Risk among the Elderly*. Washington, DC: Food Research and Action Center.
- Gilbride, J.A., E.J. Amella, E.B. Breines, et al. 1998. "Nutrition and Health Status Assessment of Community-residing Elderly in New York City: a Pilot Study," *Journal of the American Dietetic Association* 98(5):554-58.
- Grandjean, A.C., L.L. Korth, G.C. Kara, et al. 1981. "Nutritional Status of Elderly Participants in a Congregate Meals Program," *Journal of the American Dietetic Association* 78:324-29.
- Ho-Sang, G.M. 1989. *Evaluation of the Supplemental Nutrition Assistance Program for the Frail Elderly in New York State*. Unpublished doctoral dissertation from Cornell University.
- Kim, K.K., E.S. Yu, W.T. Liu, et al. 1993. "Nutritional Status of Chinese-, Korean-, and Japanese-American Elderly," *Journal of the American Dietetic Association* 93(12):1416-22.
- Kirschner Associates, Inc. and Opinion Research Corporation. 1983. *An Evaluation of the Nutrition Services for the Elderly, Volume 2: Analytic Report*. Washington, DC: U.S. Department of Health and Human Services, Administration on Aging.
- Kirschner Associates, Inc. and Opinion Research Corporation. 1979. *Longitudinal Evaluation of the National Nutrition Program for the Elderly: Report of First-Wave Findings*. Washington, DC: U.S. Department of Health, Education, and Welfare, Administration on Aging.
- Kohrs, M.B. 1986. "Effectiveness of Nutrition Intervention Programs for the Elderly," in M. L. Hutchinson and H.N. Munro (eds.), *Nutrition and Aging*. New York, NY: Academic Press.
- Kohrs, M.B. 1982. "Evaluation of Nutrition Programs for the Elderly," *American Journal of Clinical Nutrition* 36(4):812-18.
- Kohrs, M.B., J. Nordstrom, E.L. Plowman, et al. 1980. "Association of Participation in a Nutritional Program for the Elderly with Nutritional Status," *American Journal of Clinical Nutrition* 33(12):2643-56.
- Kohrs, M.B., P. O'Hanlon, and D. Eklund. 1978. "Title VII - Nutrition Program for the Elderly. I. Contribution to One Day's Dietary Intake," *Journal of the American Dietetic Association* 72(5):487-92.

- LeClerc, H.L., and M.E. Thornbury. 1983. "Dietary Intakes of Title III Meal Program Recipients and Nonrecipients," *Journal of the American Dietetic Association* 83(5):573-77.
- National Research Council. 1989. *Recommended Dietary Allowances, 10th edition*. Washington, DC: National Academy Press.
- Neyman, M.R., S. Zidenberg-Cherr, and R.B. McDonald. 1996. "Effect of Participation in Congregate-site Meal Programs on Nutritional Status of the Healthy Elderly," *Journal of the American Dietetic Association* 96(5):475-83.
- Nordstrom, J.W., O.G. Abrahams, and M.B. Kohrs. 1982. "Anemia among Noninstitutionalized White Elderly," *Nutrition Reports International* 25(1):97-105.
- O'Shaughnessy, C. 1990. *CRS Report for Congress: Older Americans Act Nutrition Program*. Library of Congress.
- Ponza, M., J.C. Ohls, B.E. Millen, et al. 1996. *Serving Elders at Risk: The Older Americans Act Nutrition Programs, National Evaluation of the Elderly Nutrition Program, 1993-1995, Volumes I, II, and III*. U.S. Department of Health and Human Services, Administration on Aging.
- Ponza, M., J.C. Ohls, and B.M. Posner. 1994. *Elderly Nutrition Program Evaluation Literature Review*. Princeton, NJ: Mathematica Policy Research, Inc.
- Posner, B.M. 1979. *Nutrition and the Elderly: Policy Development, Program Planning, and Evaluation. Chapter 8: Summary of Conclusions, Intervention Design Implications, and Future Research Needs*. Lexington, MA: Lexington Books, pp. 147-175.
- Posner, B.M., A.M. Jette, K.W. Smith, et al. 1993. "Nutrition and Health Risks in the Elderly: The Nutrition Screening Initiative," *American Journal of Public Health* 83(7):972-78.
- Roe, D.A. 1989. "Nutritional Surveillance of the Elderly: Methods to Determine Program Impact and Unmet Need," *Nutrition Today* 24(5):24-29.
- Russell, R.M., and P.M. Suter. 1993. "Vitamin Requirements of Elderly People: an Update," *American Journal of Clinical Nutrition* 58:4-14.
- Singleton, N., M.H. Overstreet, and P.E. Schilling. 1980. "Dietary Intakes and Characteristics of Two Groups of Elderly Females," *Journal of Nutrition for the Elderly* 1(1):77-89.
- Steele, M.F., and J.D. Bryan. 1986. "Dietary Intake of Homebound Elderly Recipients and Nonrecipients of Home-delivered Meals," *Journal of Nutrition for the Elderly* 5(2):23-34.
- Stevens, D.A., L.E. Grivetti, and R.B. McDonald. 1992. "Nutrient Intake of Urban and Rural Elderly Receiving Home-delivered Meals," *Journal of the American Dietetic Association* 92:714-718.
- U.S. Department of Agriculture, Food and Nutrition Service. 2003. Program data. Available: <http://www.fns.usda.gov/pd>. Accessed April 2003.
- U.S. Department of Agriculture, Food and Nutrition Service. 2002. "Nutrition Services Incentive Program (Formerly NPE)." Available: <http://www.fns.usda.gov/fdd/programs/nsip>. Accessed March 2002.
- U.S. Department of Health and Human Services, Administration on Aging. 2002. *Linking Nutrition and Health: 30 Years of the Older Americans Act Nutrition Programs—Program Milestones: 1954-2002*.
- Vaughan, L.A., and M.M. Manore. 1988. "Dietary Patterns and Nutritional Status of Low Income, Free-living Elderly," *Food Nutrition News* 60(5):27-30.
- Wellman, N., L.Y. Rosenzweig, and J.L. Lloyd. 2002. "Thirty Years of the Older Americans Nutrition Program," *Journal of the American Dietetic Association* 102(3):348-50.