



How Can We Tell If We Are Making a Difference?

ERS Efforts To Improve Evaluation of Nutrition Outcomes

Elizabeth Frazao, Joanne F. Guthrie, David Smallwood

Economic Information Bulletin Number 29-8

September 2007

Federal funding for the food assistance and nutrition programs reached almost \$53 billion in fiscal 2006, over half of USDA's budget (Oliveira, 2007). Farmers, food companies, and program participants have unequivocally benefited from the increased food spending and improved food security among participants. However, the limited information we have on the programs' impacts on nutrition and diet quality is mixed. Yet, in times of tight budgets, the pressure to demonstrate program performance increases. Program assessments and evaluations can also help programs respond to changing needs and environments.

The Food Stamp Program is one of the largest public assistance programs in the Federal safety net. Its large budget, by itself, would result in keen interest in assessing its performance. Another reason for interest is the marked evolution in nutrition concerns since the program was first designed. The program was designed to address problems related to insufficient quantity of food. Today, obesity is the most common nutrition problem among Americans, a result of consuming too many calories in relation to energy expenditures. In addition, the food choices Americans make—too much in the way of solid fats and added sugar and too few fruits, vegetables, whole grains, and other healthful foods—contribute not only to the obesity problem but also to the risk of chronic diseases, such as heart disease, hypertension, and cancer. Thus, improving diet quality has become an increasingly pressing concern. The Food Stamp Program has responded with an increased emphasis on nutrition education, promoting healthful choices while still allowing program participants to make their own decisions. Given these new priorities, how can we tell if the program is making a difference in nutrition and diet quality and, if so, how much of a difference?

Unfortunately, evaluating effects of the Food Stamp Program on diet quality is complex, expensive, and time consuming. Most existing research on nutrition and health effects of food assistance programs share three key



USDA/NAL

limitations: the difficulty in separating the effect of the program itself from other factors that may be related to program participation (that is, selection bias); relative age of the data (which do not capture current programs or population behaviors); and use of outdated dietary standards and assessment methods. In addition, conducting new evaluations is typically very costly, both in terms of dollars and time. To alleviate some of these problems, ERS has made it a priority to improve the necessary tools for evaluation—in particular, improved data, measures, and analytic methods.

Improving Data: The ERS Data Initiative and the Flexible Consumer Behavior Survey

Timely, accurate, and comprehensive data are needed to improve outcome evaluation efforts for food assistance programs. The ERS Consumer Data Initiative is designed partly to improve evaluation by enhancing existing Federal data in a cost-effective manner. Major strategies include (1) adding important questions to existing surveys, such as consumer behavior questions in the National Health and Nutrition Examination Survey; (2) expanding use of private-sector data, such as Nielsen HomeScan

Requirements for a Proposed Instrument To Measure Outcomes of Nutrition Education Efforts

The proposed data collection tool should be broadly applicable in measuring the outcomes of nutrition education efforts and contribute materially to the overall advancement of nutrition education evaluation by increasing the measurement consistency across evaluations, thus making them more comparable and more interpretable. Consistent with these goals, the following objectives are particularly applicable:

- The instrument should be relatively short. This will increase the use and acceptability in a broad range of evaluation contexts, where the resources available for evaluation data collection are limited. It will also increase response rates. We visualize the instrument requiring no more than 15 minutes to be administered.
- The instrument should be technically correct. Such issues as question flow and skip logic should be conducive to successful interviewing. The instrument's indicators of nutrition knowledge also should reflect sound nutrition research.
- The instrument should be applicable and understandable to a wide cross-section of the low-income population, as defined by such factors as ethnicity, urbanicity, and region of the country. Dietary knowledge and practices tend to be highly influenced by

cultural orientation. Different groups in the population may routinely use different language or different words to refer to similar concepts. Ensuring that the final instrument is general enough to accommodate such differences is important.

- The method for administering the instrument should be flexible. Because telephone interviews require relatively fewer resources, they are often the data collection mode of choice in evaluation work. However, there may be some evaluation contexts where one-on-one in-person interviewing fits better into the overall evaluation plans. Furthermore, in the current context of nutrition education programs, many evaluations may take place in group settings, so the instrument should also be suitable for this approach.
- The instrument should assess behaviors consistent with current dietary guidance. The instrument is intended to assess dietary behaviors that are consistent with the 2005 Dietary Guidelines and the MyPyramid Food Guidance System, covering such topics as intake of particular foods, amounts of food, and weight management. The instrument can be used to target nutrition education efforts and to determine changes following nutrition education.

food purchase data; and (3) enhancing the value of existing survey data through linkage with administrative data from Federal programs.

As a part of its new consumer data initiative, ERS has developed a Flexible Consumer Behavior Survey (FCBS) module, which, starting in 2007, will be included in the National Health and Nutrition Examination Survey (NHANES). The new FCBS—which has been tested with both average and low-income audiences—collects food-related knowledge, attitude, and behavioral data, including knowledge and attitudes concerning Federal dietary guidance, use of food labels, expanded measures of food assistance program participation, food expenditures, food availability, and food-away-from-home habits. The resulting data set will have the unique ability to link knowledge, attitude, and behavior variables to food consumption, health, and program participation data in a nationally representative sample. We will be able to identify food stamp participants and eligible nonparticipants within this sample, making it useful for examining program outcomes related to diet quality and health. Although the expanded data provided by the FCBS does not directly solve the problem of selection bias, it will improve our understanding of the relationship of important economic and policy factors to program participation and outcomes and could expand analytical options for addressing selection bias.

Improving Measures: FSNE Measure Development

Food Stamp Nutrition Education (FSNE) is USDA's major activity to promote healthier food choices by food stamp participants. However, no uniform national data on outcomes associated with FSNE are currently available. ERS is working in close collaboration with the Food and Nutrition Service, the USDA agency that administers the program, to develop a relatively simple, inexpensive, standardized measure of behaviors associated with dietary quality. This measure could be administered among adult populations across the United States who are eligible for or who are receiving food assistance (see box, "Requirements for a Proposed Instrument To Measure Outcomes of Nutrition Education Efforts"). When completed, it will provide a feasible means of collecting sufficient data to generate State-level, other subnational, and national estimates. It also could be useful in assessing differences in dietary-quality-related behaviors of food assistance program participants at the regional or State level.

Improving Assessment and Program Evaluation Methodology: The new Dietary Reference Intakes

Early studies that measured the nutritional impact of the Food Stamp Program simply compared average nutrient intakes of program participants and nonparticipants, typically as a share of the appropriate Recommended Dietary Allowance (RDA). Findings of higher nutrient intake levels

The DRIs

The Dietary Reference Intakes (DRIs) replace the Recommended Dietary Allowances (RDAs), last published in 1989 by the National Academy of Sciences. In addition to being based on more recent scientific studies, the DRIs also differ in three significant ways from the former RDAs:

- They include, to the extent possible, a reduction in risk of chronic disease, rather than merely the absence of signs of deficiency.
- They employ a new conceptual model that takes into account nutritional problems occurring due to either insufficient or excessive intakes.
- They encompass a more complete set of values, including an upper level—EARs, RDAs, AIs, and ULs (see below).

| | |
|-------------------------------------|---|
| Estimated Average Requirement (EAR) | The usual intake level estimated to meet the requirements of half the healthy individuals in a life stage and gender group. At this level of intake, the other half of the healthy individuals in the specified group would not have their needs met. |
| Recommended Dietary Allowance (RDA) | The usual intake level that is sufficient to meet the nutrient requirements of nearly all (97.5 percent) healthy individuals in a particular life stage and gender group. RDAs are estimated by adding two standard deviations to the EAR. Although defined similarly as the 1989 RDAs, the new values may be different from the 1989 values. |
| Adequate Intake (AI) | The recommended usual intake level based on experimentally derived intake levels or approximations of observed mean nutrient intakes by a group (or groups) of apparently healthy people who are maintaining a defined nutritional state or criterion of adequacy. This measure is used when scientific evidence is not sufficient to establish an EAR (and RDA). |
| Tolerable Upper Intake Level (UL) | The highest level of usual intake that is likely to pose no risk of adverse health effects to almost all individuals in the specified life stage group. As intake increases above the UL, the potential risk of adverse effects increases. |

Source: Institute of Medicine, 2000.

Findings from first-generation dietary assessments consistently show certain nutrients with dramatic dietary deficiencies or excessive intakes among some population subgroups, although they are seemingly unaccompanied by evidence of adverse biochemical, clinical, or anthropometric health problems. Whether these findings represent important or potential dietary problems that might be addressed by policy and program changes or whether they stem from methodological weaknesses in dietary

assessment methods and/or dietary reference standards is not clear. Because the new DRIs were established with the goal of reducing the risk of chronic disease and not just eliminating signs of deficiency, observing or measuring any adverse health impact in the short term (particularly among younger age groups) may be difficult, even though the long-term health impact may still be important.

among participants were then interpreted to indicate that participation in the Food Stamp Program led to “improved” nutrient intake for participants, based on the belief that “more is better,” an approach that may have been appropriate in an earlier era in which underconsumption was the major nutrition issue.

Over the past decade, however, improvements in the knowledge about human nutrient requirements led to the development of a new set of dietary reference standards—the *Dietary Reference Intakes* (DRIs). In addition to being based on more recent scientific studies, the new DRIs also make clear the problems with the presumption that “more is better” (for more details, see box, “The DRIs”).

The first problem is that, once intake is adequate and sufficient to meet dietary needs, consuming more offers no additional benefits. This problem is particularly relevant to studies that compared intakes using the RDAs because the RDA values included a large margin of safety in order to cover

the needs of nearly all healthy individuals. As a result, intakes below the RDA do not necessarily indicate insufficient intake.¹ The second problem is that, for some nutrients, too high an intake may present a problem.

These two problems make it clear that just because average intake for one group is higher than for a second group does not necessarily mean that the first group is “better off.” Instead, they point to the importance of considering the entire distribution of nutrient intake, rather than just the average. This discovery led to the development of a new statistically based methodology to assess nutrient intake using the distribution of nutrient intake and the distribution of requirements. The new methodology allows analysts to estimate the proportion of a population subgroup with inadequate as well as excessive intakes and, thus, provides a better and more meaningful nutrition assessment methodology.

¹However, the lower the intake relative to the RDA, the greater the probability of inadequate intake.

Table 1
Nutrients with dramatic dietary deficiencies or excessive intakes

| Nutrient | Findings |
|----------------------|---|
| Energy | Estimated energy intakes greatly exceed energy requirements for infants and children |
| Zinc, vitamin A | High share of infants and children have usual intakes above Tolerable Upper Intake Levels (ULs) |
| Magnesium, vitamin E | All subgroups of the population have high prevalence of inadequacy |
| Fiber, potassium | Intakes are very low relative to DRI standards |

Source: Devaney et al., 2007.

Although the new DRIs and the new methodology have not yet been used to evaluate the Food Stamp Program, they are being used increasingly for general dietary assessments, which are helpful in identifying nutrients of public health interest. Recent findings from first-generation studies, however, have identified some nutrients for which considerable dietary excesses or deficiencies have been estimated, although unaccompanied by any reports of adverse health effects or other type of concern (table 1). These findings have raised some concerns about the accuracy of those DRIs and whether they should be reviewed before they are used for program evaluation or planning.

An ERS-sponsored review of the models and methods used in assessments of dietary intakes relative to the DRIs for selected nutrients concluded that errors in dietary recall data may partially—but not fully—explain some of the findings. For example, the large proportion of adults identified as consuming inadequate amounts of vitamin E may be partially explained by underreporting of food intake. Additional difficulties in collecting reliable data on the amounts and types of fats and oils consumed and highly variable and imputed data on vitamin E values in nutrient composition databases further suggest that vitamin E intake may be underestimated. However, the review also identified a number of limitations in the studies and data used to derive those DRIs, raising the possibility that some DRI values may benefit from additional scientific review (Devaney et al., 2007).

For the remaining nutrients, however, we anticipate that both the new standards and the methodology for assessing nutrient adequacy will be useful for program evaluation,

following the Institute of Medicine’s example of how to apply the new methodology to assess program impact (Institute of Medicine, 2000).

Conclusions

A number of changes in Food Stamp Program policy have been proposed to improve food choices and diet quality of participants. Yet inadequacies of data, measures, and analytic methods have limited our understanding of the program’s effects on food choice and diet quality. Improving evaluation of the current program could provide a better sense of the nature and extent of the problems that need to be addressed. Improving evaluation is also necessary to assess the effects of any proposed changes in the program that are adopted. The problem of selection bias has not yet been solved. Nevertheless, expanded data and better measurement and analytical methods, such as the ability to estimate the change in the proportion of a population subgroup with inadequate or excessive nutrient intakes, will aid us in conducting more definitive evaluations. These evaluations will give policymakers, program officials, and interested citizens the information they need to make better decisions.

Information Sources

Devaney, B., M.K. Crepinsek, K. Fortson, and L. Quay. *Review of Dietary Reference Intakes for Selected Nutrients: Challenges and Implications for Federal Food and Nutrition Policy*, Contractor and Cooperator Report No. 28, U.S. Department of Agriculture, Economic Research Service, February 2007, available at: <http://www.ers.usda.gov/Publications/ccr28/>.

Guthrie, J.F., E. Stommes, and J. Voichick. “Evaluating Food Stamp Nutrition Education: Issues and Opportunities,” *Journal of Nutrition Education and Behavior* 38(1):6-11, January-February 2006.

Institute of Medicine. *Dietary Reference Intakes: Applications to Dietary Assessment*, Washington, DC: National Academy Press, 2000.

Institute of Medicine. *Dietary Reference Intakes: Applications to Dietary Planning*, Washington, DC: National Academy Press, 2003.

Oliveira, V. *The Food Assistance Landscape: FY 2006 Annual Report*, Economic Information Bulletin No. eib6-4, U.S. Department of Agriculture, Economic Research Service, February 2007, Available at: <http://www.ers.usda.gov/Publications/eib6-4/>.

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, age, disability, and, where applicable, sex, marital status, familial status, parental status, religion, sexual orientation, genetic information, political beliefs, reprisal, or because all or a part of an individual's income is derived from any public assistance program. (Not all prohibited bases apply to all programs.) Persons with disabilities who require alternative means for communication of program information (Braille, large print, audiotape, etc.) should contact USDA's TARGET Center at (202) 720-2600 (voice and TDD).

To file a complaint of discrimination write to USDA, Director, Office of Civil Rights, 1400 Independence Avenue, S.W., Washington, D.C. 20250-9410 or call (800) 795-3272 (voice) or (202) 720-6382 (TDD). USDA is an equal opportunity provider and employer.