United States Department of Agriculture

Supplemental Nutrition Assistance Program Education and Evaluation Study (Wave II)

Nutrition Assistance Program Report **December 2013**

Food and Nutrition Service
Office of Policy Support

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Executive Summary

The executive summary presents the background, methods, and key findings of the final report produced for the U.S. Department of Agriculture (USDA) Food and Nutrition Service (FNS) *SNAP Education and Evaluation Study, Wave II*. This study evaluated three Supplemental Nutrition Assistance Program Education (SNAP-Ed) demonstration projects. The findings and methodology specific to each demonstration project are presented in three separate case study reports.[1] Each evaluation included three components: a process evaluation of the program's implementation, an evaluation of the program's impact on nutrition behaviors, and an assessment of the methods and results of the self-evaluations conducted by the implementing agency (IA).

A. Background

1. Overview of SNAP-Ed

Under subcontract agreements with State Supplemental Nutrition Assistance Program (SNAP) agencies, a variety of organizations partnered to implement SNAP-Ed within States (Implementing Agencies). The goal of SNAP-Ed is to improve the likelihood that SNAP participants and persons eligible for SNAP nutrition assistance will make healthy food choices within their limited budgets and choose physically active lifestyles. FNS' SNAP-Ed Guiding Principles call for interventions that are evidence-based and behaviorally focused. FNS also requests that States' SNAP-Ed efforts be consistent with the Dietary Guidelines for Americans, including the following:[2]

- Eat fruits and vegetables, whole grains, and fat-fee or low-fat milk products every day.
- Be physically active every day as part of a healthy lifestyle.
- Balance caloric intake from food and beverages with calories expended.

The SNAP-Ed Plan Guidance also encourages all States to include a component in their SNAP-Ed plans to evaluate the effectiveness of their SNAP-Ed interventions. These can include formative, process, outcome, and impact evaluations. In Federal Fiscal Year (FY) 2004, 74 percent of SNAP-Ed IAs conducted outcome evaluations on at least some aspects of their programming. However, based on interviews with 17 IAs, these evaluations were focused to a greater extent on process outcomes, such as program use, than they were on participant behavior change (U.S. Department of Agriculture [USDA], 2004). As one of the largest Federal funding sources for nutrition education, FNS, States, and local IAs have a significant stake in ensuring that SNAP-Ed meets FNS' goals.

To identify effective models of SNAP-Ed and evaluation and to collect information on the implementation and impacts of SNAP-Ed programs, FNS contracted with Altarum Institute and RTI International to conduct a rigorous independent evaluation of three competitively selected models of SNAP-Ed that show promise for behavior change. The goal of this study is to determine whether the selected projects can serve as good examples of SNAP-Ed delivery by meeting the following criteria:

[1] The individual case study reports for each demonstration project are published separately and included in the reference list at the end of this report. They are available at http://www.fns.usda.gov/research-and-analysis.

[2] See the SNAP-Ed Plan Guidance at http://www.nal.usda.gov/fsn/Guidance/FY2012SNAP-EdGuidance.pdf and the SNAP-Ed Connections Web site at http://snap.nal.usda.gov.

- Positively affecting the nutrition and health behaviors of SNAP clients while adhering to FNS Guiding Principles,
- Exhibiting the potential to serve as models of effective nutrition intervention for large segments of the SNAP audience that can be replicated by other IAs, and
- Providing methodologically robust yet logistically practical examples of project-level SNAP-Ed evaluation efforts.

FNS also sought to understand the factors influencing the implementation of these nutrition education programs and lessons learned from these projects' experiences.

2. Selection and Overview of Wave II Demonstration Projects

In FY 2009, FNS issued a request for applications to States to propose model SNAP-Ed programs and participate in the FNS-funded independent evaluation. Compared with the *SNAP Education and Evaluation Study, Wave I*, this request for applications expanded the variety of intervention types and target audiences. Applicants proposed various program and evaluation designs for children, women, and seniors as target audiences. Numerous applications were received, including ongoing SNAP-Ed programs, modifications to existing programs, and new programming models. Each application was competitively scored and ranked by an independent technical review panel chaired by FNS. The highest-scoring applicants were selected as finalists and asked to respond to clarification questions. Based on these responses, the review panel selected three projects to participate in the study:

- **The Iowa Nutrition Network's (INN) Building and Strengthening Iowa Community Support for Nutrition and Physical Activity Program (BASICS);**
- **The University of Kentucky Cooperative Extension Service's (UKCES) Literacy, Eating, and Activity for Primary School-Aged Children (LEAP2); and**
- **The Michigan State University Extension's (MSUE) Eat Smart, Live Strong (ESLS) Program.**

All three agencies implemented their model SNAP-Ed program between October and June of FY 2012. Additionally, the three agencies conducted their own evaluations, supported by SNAP-Ed administrative funds and other funding resources. Each demonstration project received a $100,000 incentive to offset expenses directly incurred as a result of their participation in this evaluation project, such as those associated with facilitating access to SNAP-Ed participants, participating in interviews, keeping records, and providing documents describing the implementer's SNAP-Ed intervention and evaluation processes.

Two of the selected demonstration projects, the BASICS[3] and LEAP2 programs, implemented interventions targeting low-income children in elementary school settings. Despite variations in their nutrition education messages, modes of delivery, and planned nutrition education dosage, both child-focused interventions aimed to increase children's consumption of fruits and vegetables. Children's exposure to direct education ranged from a total of 240 minutes for the LEAP2 program (eight lessons averaging 30 minutes) to 448 minutes for the BASICS intervention (eight core lessons averaging 31 minutes, plus an average of 50 minutes for the four extended lessons). In addition, both of these interventions sought to engage parents and caregivers through direct education lessons, participatory family events, or take-home materials and activities.

[3] The BASICS intervention delivers nutrition and physical activity education through a school-based program. The BASICS Plus intervention added a multichannel nutrition education social marketing program to the school-based BASICS intervention.

The ESLS program differed from the other two programs in that its target audience was adults aged 60 to 80. The behavior-related goals of the ESLS program are to increase consumption of fruits and vegetables and physical activity. Conducted at senior sites and other locations where seniors gather, ESLS provided direct education with take-home materials and activities. Seniors who participated in the ESLS program received a total of 259 minutes of nutrition education (four lessons ranging from 61 to 68 minutes).

The three demonstration projects also varied in their nutrition education programs' relative maturity. The BASICS curriculum has been implemented by INN for more than a decade, making it one of the longest-running of the three demonstration projects, whereas the LEAP2 program was implemented for the first time in 2011. The ESLS program, developed by FNS eight years ago, had not been widely used by MSUE educators until the start of this study. Additionally, the demonstration projects were diverse in their geographic scope, ranging from implementation in a single metropolitan area or county to multiple counties in a State. For this reason, the number of sites differed by project.

B. Study Methodology

1. Process Evaluation Methods

The process evaluations began by creating a baseline description of the objectives, approach, and components of the design, administration, and implementation of each program. This information was obtained from interviews with program-level staff members and from secondary program documents. Once the intervention was implemented, data collection and analysis of information on factors influencing the implementation began, resulting in the lessons learned for program improvement and replicability.

Across the three demonstration projects, primary data were collected from five categories of key informants: program-level staff members, direct educators, intervention site administrators (school principals or senior center directors), intervention site classroom teachers, and program participants or their parents and caregivers. Key-informant interviews were conducted approximately one month before the start of the interventions and again immediately following their completion. This information was supplemented through direct observation by evaluation team members.

Data collectors used standardized secondary data abstraction tools and primary data collection instruments designed for the evaluation of the three SNAP-Ed demonstration projects. The wording of the questions in each key-informant interview guide and focus group discussion guide was tailored to the specific characteristics of each project. In addition, key-informant interviews included relevant, probing questions to allow for in-depth discussions of important issues or topics raised by the respondents. Data collection commenced in July 2011.

The analysis approach for the process evaluation included a combination of qualitative and quantitative methods. Program administrative data were used to calculate project reach, and a combination of administrative data and participant survey data was used to estimate the average amount of exposure that participants had to each intervention. Information on program costs and budget justifications were obtained directly from reports submitted by the SNAP-Ed IA to the evaluation team, and per participant costs were estimated based on program implementation costs and reach. SAS 9.3 was used to analyze program dosage, participant satisfaction, and factors affecting program access from the survey responses of parents and caregivers of children in the child-focused demonstration projects and seniors who participated in the ESLS program. Qualitative analysis was conducted on information collected from secondary documents, key-informant interviews, focus groups, and open-ended responses to survey questions. This methodology was

used to accurately describe the programs' design and implementation, to identify common themes in program successes and challenges, and to assess lessons learned. The qualitative information was triangulated with the quantitative survey findings to confirm or further explain these findings.

2. Impact Evaluation Methods

Designing the impact evaluations required the consideration of a number of factors, such as the characteristics of the interventions, the target audience, and the IA's proposed methods for its self-evaluation. Although the approaches used to evaluate the impact of each program were similar, each was tailored to the particular characteristics of the intervention.

Conceptual framework and outcome measures. The impact evaluations were guided by a conceptual framework that helped track the range of potential program effects. This framework was adapted from Green and colleagues (1980) and has been used by others to capture the main types of secondary outcomes associated with changes in nutrition behavior (Mullen, Hersey, & Iverson, 1987). This framework informs the evaluation of program effects through the specification of secondary (intermediate) outcomes that link the intervention to the long-term primary outcome of average daily consumption of fruits and vegetables. The secondary outcomes capture in greater detail some of the complexity of the behavior change process. The greater the number and strength of the changes seen among the secondary outcomes, the greater the likelihood of observing changes in fruit and vegetable consumption. The secondary outcomes include mediating factors (e.g., predisposing, enabling, and reinforcing factors) and short-term outcomes.

Primary impacts. For the child-focused interventions—BASICS and LEAP2—the primary outcome measure was children's average daily at-home consumption of fruits and vegetables combined, as reported by their parent or caregiver. It was hypothesized that children participating in the program would increase their average daily at-home consumption of fruits and vegetables combined by approximately 0.30 cups per day, compared with children not participating in the program. The impact of the BASICS program on children's at-home use of 1 percent or fat-free milk during the past week was also examined.

For MSUE's ESLS program, the impact of the program on the primary outcome measure of average daily consumption of fruits and vegetables combined was assessed. It was hypothesized that ESLS program participants would increase their reported daily consumption of fruits and vegetables combined by approximately 0.30 cups, compared with those individuals not participating in the program.

Evaluation design. The three evaluations used research designs that employed comparison strategies so that plausible alternative explanations of program impact could be ruled out:

- BASICS: To assess the impacts of the BASICS and BASICS Plus interventions, the independent evaluator compared each intervention with a no-treatment comparison group and then compared the two programs with each other. Since the social marketing campaign included in BASICS Plus posed risks of contamination when applied using random assignment of schools to study conditions, a quasi-experimental research design was used. INN purposively assigned school districts to the intervention and comparison groups and recruited schools in each district to participate in the study.
- LEAP2: A randomized experimental design was used for evaluating the LEAP2 program with schools matched and random assignment made to the intervention or control group.
- ESLS: Although the independent evaluator developed a randomized experimental design with random assignment of centers to the intervention or control group, because of challenges faced by MSUE in recruiting and retaining centers, it was determined the experimental design was no longer

feasible after the start of data collection. MSUE added classes at larger centers and centers within counties already included in the study so that the final design was quasi-experimental.

Data collection. For the BASICS and LEAP2 evaluations, the independent evaluator used a mail and telephone survey approach to collect parents and caregivers' reports of their children's at-home consumption and other dietary behaviors at baseline and follow-up.[4] For the ESLS evaluation, the baseline survey was administered in person, concurrent with MSUE's own survey administration; and the follow-up survey was mailed, with telephone follow-ups to non-respondents. Across the three evaluations, response rates for the follow-up surveys ranged from 77 to 98 percent. The independent evaluator achieved the required sample sizes based on the power analysis calculations for each evaluation.

Impact analysis. The similarity of the intervention and control/comparison groups was assessed at baseline, and the potential effect of attrition from the evaluation study on generalizability was investigated. The modeling approaches used evaluated the impact of the programs while accounting for the clustering of children or participants within schools or senior centers; included difference-in-difference estimates of program impacts, comparing change across time (baseline and follow-up) in the intervention group with change across time in the comparison group; and included covariates describing participant characteristics.

3. Assessment of the Self-Evaluations

This study also examined the soundness of the self-evaluations conducted by each IA. This assessment encompassed a detailed description of the evaluation methodology used by the IAs, including the management, staffing, and costs of the evaluation; an assessment of the quality of the self-evaluations, including an identification of strengths, weaknesses, and areas for improvement; and a comparison of the results from the self-evaluations with those of the independent impact evaluations.

C. Process Evaluation Findings

1. Child-Focused Demonstration Projects

a. Implementation Successes

Findings from the process evaluation indicate that, in general, the child-focused demonstration projects were implemented as planned with the following key successes:

- **Program design, content, and messages were very well-received by school staff at the intervention sites.**

School principals and teachers at participating sites routinely praised each program's design, messages, and materials. In key-informant interviews, principals and teachers frequently noted that they enjoyed the program focus on nutrition and physical activity, appreciated the use of multiple methods for delivering nutrition messages, and valued the high quality of the educational materials and the direct education staff. School principals and teachers across these programs said that the lessons and methods reflected an in-depth knowledge not only of the target population's needs but of how school-age children learn. In particular, principals and directors appreciated the interactive, child-focused nature of the lessons, as well as the use of parent education as a way to encourage change in children's behavior. School staff also appreciated the flexibility of SNAP-Ed program staff in accommodating class needs, staff schedules, and unexpected events.

[4] The survey instrument and other survey materials were available in English and Spanish for the BASICS evaluation.

- **Most school principals and teachers helped support program implementation and reinforced nutrition messages with children.**

Based on information gathered from a number of key-informant interviews, the majority of principals and teachers were very supportive throughout program implementation. For the BASICS intervention, supplemental materials were provided to teachers in an effort to increase their buy-in and encourage their reinforcement of the program's messages in the classroom. Nearly all teachers who participated in the BASICS intervention sites reported delivering nutrition messages to children in their classrooms during the time of the intervention. For the LEAP2 program, educators worked closely with the school's family resource coordinators, staff members designated to be a resource for family programming and support. Although teachers involved in the LEAP2 program had difficulty implementing the daily fruit and vegetable recall activity, they reported a high degree of satisfaction with the LEAP2 messages.

- **Direct educators were effective and well-prepared, and they found the curricula easy to implement.**

An important facilitator noted by all stakeholders was the effectiveness of the direct educators. Principals and teachers commented on the professionalism and dedication of the direct educators. The most often cited reasons for the effectiveness of the direct educators were their ability to engage the students and their level of preparation. The ease with which direct educators were able to implement the curriculum was fundamental to their successful implementation. Direct educators' confidence in their ability to teach the curriculum was critical in terms of winning the support of school principals, as well as in ensuring program fidelity across the intervention sites.

These implementation successes suggest that demonstration project planners and implementers have a deep understanding of their target audiences and an exceptional dedication to quality, both of which could serve as best practices for future SNAP-Ed program implementers as they develop their own plans for implementation.

b. Implementation Challenges

At the same time, the process evaluation identified a number of challenges in implementing the two child-focused projects that might have affected the programs' impact on children's at-home consumption of fruits and vegetables. These factors are briefly described below:

- **Maximizing parent and caregiver reach and engagement.**

Many key informants identified reaching and engaging parents and caregivers as a key challenge to the effective implementation of school-based curricula. Although a secondary audience, parental engagement is a critical component of the reinforcement of nutrition messages. For both the LEAP2 and BASICS interventions, where parents were reached with an indirect education component, parents reported that they would have been better prepared to support their children's behavior change if they had known more about the program goals and content. Across the two projects, parents and caregivers most commonly cited limited time, schedule conflicts, and difficulty relying on children to bring home materials as reasons for not participating in sessions or using take-home nutrition education materials and activities.

- **Maximizing social marketing campaign messaging to effectively reach parents and caregivers.**

The BASICS Plus intervention included a social marketing component to support the BASICS curriculum messaging conveyed in the classroom. To determine awareness of the social marketing campaign, parents and caregivers were surveyed about their familiarity with the three social marketing nutrition education

campaign messages: Pick a **better** snack™ (PABS), Bodies Change, and Be Strong. By far, parents and caregivers reported more familiarity with the more established PABS campaign messages than the newer Bodies Change and Be Strong campaign messages.

- **Maximizing school staff engagement in supporting program implementation.**

Although the level of engagement across child-focused programs was generally high among school principals and classroom teachers, there were several teachers who reportedly were not very engaged and did not provide needed help in program implementation. In classrooms where the teachers were not actively engaged, key informants reported that implementation was challenging. They pointed out that less engaged teachers did not provide the support that direct educators needed to facilitate scheduling, reinforce lessons, and integrate nutrition concepts into the classroom.

- **Parent and caregiver concerns about costs of purchasing fruits and vegetables and trying new recipes.**

Focus group participants from both child-focused programs cited the high cost of fruits and vegetables that made it difficult for many parents to make some of the recommended dietary changes. These parents also said that they were reluctant to try some of the recipes because they could not afford to waste the leftovers if their child would not try the new foods. Though not specified in the nutrition messages of the child-focused demonstration projects, several parents of children in the BASICS intervention clearly perceived that they were being encouraged to feed their children only fresh fruits or vegetables, instead of canned, frozen, or dried forms. However, focus group participants expressed concern about the expense of maintaining an adequate supply of fresh produce with limited shelf life.

- **Providing face-to-face interactive training for direct educators.**

Program administrators for both child-focused projects noted the importance of providing sufficient curriculum training to promote confidence and skill among direct educators. Two common aspects of effective training cited by program administrators and educators were having face-to-face training and having an interactive component for educators to practice with the material prior to using it in the classroom. Although preferred, face-to-face training can be challenging, with project staff working in different areas of the State.

- **Implementation timeframe imposed by the independent evaluation.**

Due to the time needed to secure Office of Management and Budget (OMB) approval for data collection and the requirements for the successful completion of the independent evaluation's data collection and analysis, program planners reported having to make adjustments in their intervention scheduling. Both child-focused programs started one month later than their original implementation plan, causing some challenges in implementation. For the BASICS interventions, the specific challenge was doubling up on lessons in the month of November. For the LEAP2 program, the delay caused the curriculum to be interrupted by both the Thanksgiving and Christmas holidays, which reportedly disrupted the continuity of the lessons and a daily activity completed by the children to record their fruit and vegetable consumption.

2. Senior Focused Demonstration Project

a. Implementation Successes

Findings from the process evaluation indicated that ESLS, the senior-focused demonstration project, experienced the following key successes.

- **ESLS curriculum relevant for senior populations, well-designed, and easy to implement.**

ESLS educators reported that the focus on eating more fruits and vegetables and physical activity was valuable for seniors and that the lesson format encouraged communication, ideas, and discussion among participants. Direct educators also reported that the curriculum was appropriately designed for seniors who attended the lessons. ESLS educators reported that the participants were all very engaged in the sessions. Senior participant engagement in the intervention was corroborated by the survey of ESLS participants.

- **High degree of participant satisfaction with program and program materials.**

Seniors who participated in focus group discussions provided positive feedback about the ESLS program and take-home materials. They consistently said that they liked the messages in the program and found the materials useful in helping them eat healthier foods.

Moreover, observations of ESLS sessions at selected senior centers clearly demonstrated that seniors were engaged in the program by questions that they asked and input that they provided.

- **Mode of nutrition education delivery well-received by key stakeholders.**

The directors enjoyed having this programming available for their participants, because it was related to health and provided programming variety for their seniors. They also reported that the four one-hour sessions worked well for senior audiences. More than one senior center director mentioned that the content of the ESLS program and the methods used in teaching it were appropriate for seniors.

- **MSUE direct educators well-received by senior centers and participants.**

Focus group participants reported a high-degree of respect for MSUE educational programming. Seniors noted that the combination of programming from MSUE and the quality of educators employed by cooperative extension imparted a level of respect for programs that they offered to the community.

b. Implementation Challenges

At the same time, there were many challenges in the implementation of the ESLS program identified by the process evaluation that might have had an impact on seniors' consumption of fruits and vegetables. These factors are briefly described below.

- **Recruitment of age-appropriate seniors into ESLS lessons.**

In the implementation of the ESLS program, it was necessary to extend the timeline for recruitment of seniors and expand the age eligibility requirement to recruit the needed number of seniors. Even with these changes, 12 percent of senior center participants who were recruited were not eligible to participate according to the ESLS age guidelines.

ESLS is designed for able-bodied, independent adults 60 to 74 years of age (USDA, 2007a). This age range is difficult to achieve at senior sites, where many participants are older than 74 and do not want to be excluded from programming.

As reported in the ESLS educator survey, the majority of educators asked the senior center site administrators to assist in recruiting seniors for the ESLS program. Educators reported some centers recruited 10 participants per class (the targeted class size) and others recruited only five to eight participants. Educators believed that the challenge in recruitment was due to transportation issues, health problems, having other things to do, timing, unwillingness to commit to a four-week program, and seniors leaving the area for the winter. During the course of the study, when MSUE was experiencing difficulties in the

recruitment of the target age range, FNS allowed an age range of 60 to 80 years to be enrolled in ESLS for the purpose of the study.

- **Maximizing participant engagement in take-home activities.**

ESLS lesson materials included handouts for participants to complete in class, take-home reference materials, and a "Set Your Goals" activity sheet to complete and bring back to the next class. The activity sheets asked participants to set physical activity and fruit and vegetable consumption goals for the next week. A majority of participants either agreed or strongly agreed that filling out the activity sheets influenced them to eat more fruits and vegetables. However, 37 percent did not complete all four activity sheets. Motivating a higher percentage of senior ESLS participants to complete all activity sheets each week would assist in the promotion of positive behaviors and set the stage for discussion of barriers and challenges in class.

- **Cost of purchasing fruits and vegetables.**

Although the materials include references and activities that clearly point out the use of fresh as well as canned, frozen, and dried fruits and vegetables, seniors felt that in general, the cost of fresh fruits and vegetables can be a barrier to consuming more.

In focus group discussions, some seniors stated that, while they very much liked the goals of the program, the cost of fresh fruits and vegetables on a very limited budget was a major barrier to increasing the amount of fruits and vegetables in their diet. They also stated that it could be difficult to make trips to the grocery store for fresh fruits and vegetables regularly if they do not have transportation.

D. Impact Evaluation Findings

1. Primary Impact Results

Based on the results of the impact analyses, the BASICS interventions and the ESLS program had statistically significant impacts on several primary outcomes, compared with a no-treatment group; the BASICS Plus intervention also demonstrated statistically significant impacts compared with the BASICS intervention. The LEAP2 program did not demonstrate a statistically significant impact on parental reports of children's at-home daily consumption of fruits and vegetables individually or combined.

a. Fruit and Vegetable Consumption

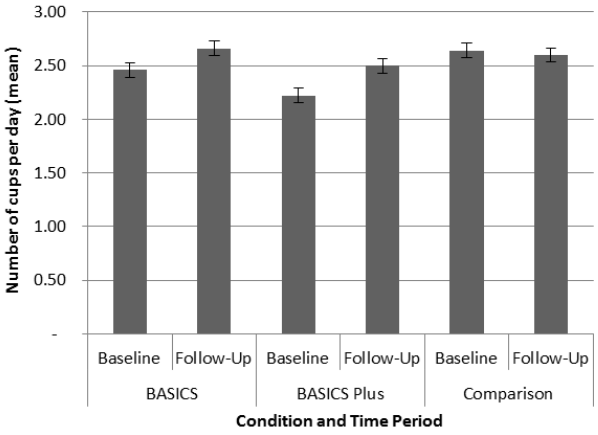
- Compared with the comparison group, the BASICS and BASICS Plus interventions had significant impacts on parental reports of children's daily at-home consumption of fruits and vegetables combined (see Figure ES-1). The BASICS Plus intervention increased children's average daily consumption of fruits and vegetables combined by 0.31 cups ($p < 0.01$), and the BASICS intervention increased children's average daily consumption of fruits and vegetables combined by 0.24 cups ($p < 0.05$).[5] Both programs also demonstrated significant impacts on at-home fruit consumption.
- When the two interventions—BASICS and BASICS Plus—were compared, there was no impact on fruit and vegetable consumption combined or individually. However, in comparing each program with the comparison group, BASICS Plus had an impact on vegetable consumption but BASICS did

[5] Some of the observed differences in baseline fruit and vegetable consumption in the BASICS and BASICS Plus programs may be due to the quasi-experimental nature of the design and pre-existing differences among the individuals living in each of the communities for the two intervention groups and the comparison group.

not. Thus, these findings suggest that the addition of the social marketing component of the BASICS Plus intervention provided additional measureable effects for children's vegetable consumption.

- The ESLS program had a significant impact on participants' average daily consumption of fruits and vegetables individually and combined (see Figure ES-2). The ESLS program increased participants' average daily consumption of fruits and vegetables combined by 0.52 cups ($p < 0.01$).

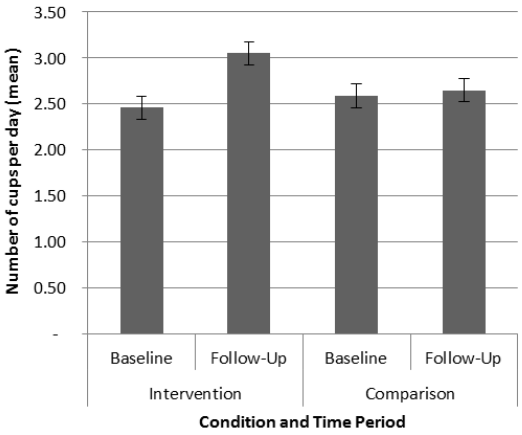
Figure ES-1. BASICS Impact Evaluation—At-Home Consumption of Fruits and Vegetables Combined



Notes:

BASICS Plus vs. comparison = 0.31 cup increase, $p < 0.01$
BASICS vs. comparison = 0.24 cup increase, $p < 0.05$,
BASICS Plus vs. BASICS = no impact

Figure ES-2. ESLS Impact Evaluation—Daily Consumption of Fruits and Vegetables Combined

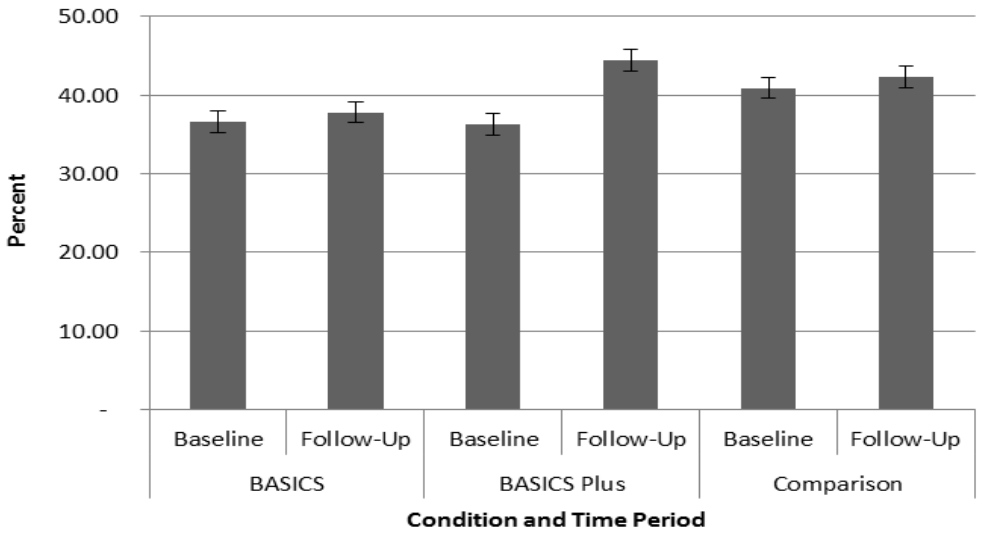


Note: ESLS vs. comparison = 0.52 cup increase, $p < 0.01$

b. At Home Use of 1 Percent or Fat-free Milk

- The BASICS Plus intervention, which included a social marketing campaign—"Their bodies change, so should their milk"—promoting 1 percent or fat-free milk, had a significant impact on parental reports of children's at-home use of 1 percent or fat-free milk (see Figure ES-3). Children in the intervention group were about 32 percent more likely than children in the comparison group to drink or use 1 percent or fat-free milk on their cereal instead of 2 percent or whole milk (odds ratio = 1.32, $p < 0.05$). The BASICS intervention did not have an impact on this outcome measure.
- When the two interventions—BASICS and BASICS Plus—were compared, the BASICS Plus intervention had a significant impact on parental reports of children's at-home use of 1 percent or fat-free milk. Children in the BASICS Plus group were about 34 percent more likely than children in the BASICS group to drink or use 1 percent or fat-free milk on their cereal instead of 2 percent or whole milk (odds ratio = 1.34, $p < 0.05$). These findings suggest that the addition of the social marketing component of the BASICS Plus intervention provided additional measureable effects for children's at-home use of 1 percent or fat-free milk.

Figure ES-3.BASICS Impact Evaluation—Percentage of Children's At-home Use of 1 Percent or Fat-free Milk



Notes:
BASICS Plus vs. comparison = odds ratio 1.32, $p < 0.05$
BASICS vs. comparison = no impact
BASICS Plus vs. BASICS = odds ratio 1.34, $p < 0.05$

2. Secondary Impact Results

Contrasted with the comparison group, the interventions had limited impact on the secondary outcomes of interest as summarized below.

- **Willingness.** The BASICS and BASICS Plus interventions had a significant impact on children's willingness to try a new kind of fruit (odds ratio = 2.58, $p < 0.01$; and 1.79, $p < 0.01$, respectively).
- **Variety.** The BASICS Plus intervention significantly increased the number of days on which children ate more than one kind of vegetable (0.41 days, $p < 0.05$), while the BASICS intervention increased the number of days on which children ate more than one kind of fruit (0.47, $p < 0.05$).
- **Availability.** The LEAP2 program had a significant impact on the household availability of fruits and vegetables (0.19 increase on 1–9 index score, $p < 0.05$).
- **Choosing Fruits and Vegetables.** For the ESLS program, there was a significant increase in the proportion of participants who agreed or strongly agreed that they add fruits or vegetables as ingredients during meal preparation to help them eat more fruits and vegetables (odds ratio = 1.93, $p < 0.05$).

The two child-focused programs did not appear to influence reinforcing factors, such as parents offering children fruits or vegetables as snacks, or efficacy (i.e., parent can encourage a child to try new fruits or vegetables). Overall, these findings suggest that while the BASICS, BASICS Plus, and ESLS programs impacted the primary outcomes, the impact on the secondary outcomes was limited.

Exhibit ES-1 summarizes the impact evaluation findings. The columns represent the program effects (mediating factors, short-term outcomes, and primary impacts) from the evaluation framework. The BASICS Plus, BASICS, and ESLS programs had a statistically significant impact on their primary outcomes; the

LEAP2 program did not affect the primary outcomes of interest. Likewise, statistically significant impacts on short-term outcomes were observed for the BASICs Plus, BASICS, and ESLS programs, but not for LEAP2. Statistically significant impacts on mediating factors were observed for BASICs Plus, BASICS, and LEAP2, but not ESLS.

Exhibit ES-1. Statistically Significant Impacts for the Three Demonstration Projects

Program	Secondary Impacts		Primary Impacts
	Mediating Factors	Short-Term Outcomes	Long-Term Outcomes
BASICS	●	●	●
BASICS Plus	●	●	●
LEAP2	●	○	○
ESLS	○	●	●

● Statistical significance at $p \leq 0.05$

○ Not statistically significant, $p > 0.10$

E. Findings From the Assessment of the Self-Evaluations

The evaluation approaches and the quality of the IA's self-evaluations varied; however, the assessment identified some common areas where changes could be made by the IAs to improve the quality of future evaluations.

1. Self-Evaluation Approaches

A descriptive assessment of the evaluation approach of each IA included consideration of the study design and sampling strategy, sample size estimation, primary outcome measures, data collection procedures, and analysis procedures. Key similarities and differences among the three self-evaluations included the following:

- The IAs used the same study design and sampling strategy used by the independent evaluator. INN and MSUE used a quasi-experimental design, and UKCES used a fully randomized experimental design.
- UKCES and MSUE directly assessed the impact of their interventions on fruit and vegetable consumption, whereas INN used a summary index of fruit and vegetable preference.
- The type of data collection varied for the three demonstration projects. INN conducted surveys of students at baseline and follow-up to collect information on fruit and vegetable preference. UKCES asked students in the intervention and control groups to fill out daily fruit and vegetable calendars to record their daily intake and also conducted photographic assessments of in-school lunch consumption at baseline and follow-up at a subset of schools. MSUE conducted surveys and 24-hour food recalls with participants at baseline and follow-up.
- The type of data analysis conducted varied, depending on the type of data collected.

2. Strengths and Limitations of the Self-Evaluations

In general, the self-evaluations were well-designed and -executed. The assessment of the self-evaluations conducted by the independent evaluator identified the strengths summarized below:

- A common strength was the use of a viable comparison strategy (the same research design used by the independent contractor) to reduce plausible alternative explanations of program impact.
- Other strengths common to the three self-evaluations were acceptable retention levels and minimal missing data for the impact analysis, which helps minimize survey and item nonresponse bias, respectively.
- MSUE and INN adequately trained their data collectors and provided sufficient oversight during data collection.
- UKCES used photographic assessments of children's plates, a data collection approach that does not rely on self-reports; however, the assessment was collected in a subset of the schools, thus limiting the value of this analysis.
- MSUE used 24-hour food recalls for collecting information on fruit and vegetable consumption, the gold standard for measuring dietary intake.

There were no limitations common to all three self-evaluations. Limitations common to two of the self-evaluations or limited to only one included the following:

- INN and UKCES did not determine the anticipated size of the program impact on the target audience before conducting the intervention and did not conduct an attrition analysis to assess the potential effect of attrition from the evaluation study on generalizability of the impact analysis findings.
- INN used an outcome measure that was not very sensitive to change.
- The impact analyses conducted by INN did not appropriately take into account the complexity of the evaluation design (clustering of individuals within schools); thus, the level of variation in measured outcomes may be underestimated.
- UKCES had the control group complete the fruit and vegetable calendar component of the intervention that could have influenced behavior change, and limited the photographic assessment to a subset of schools. Additionally, use of fruit and vegetables calendars as a measurement tool may not provide reliable consumption data for elementary-school children.
- MSUE experienced difficulties in enrolling the specified number of participants meeting the age criterion for the study.

F. Recommendations for SNAP-Ed Program Implementation and Evaluation

The impact evaluation findings suggest that SNAP-Ed for children and their parents or caregivers can improve children's nutrition behaviors but, as summarized above, in one of the two child-focused programs there was no increase in children's overall at-home fruit or vegetable consumption. The programs appeared to have limited influence on mediating factors, such as in-home availability of fruits and vegetables and parental offerings of fruits and vegetables for snacks or at dinner, which would serve to reinforce healthy nutrition behaviors.

1. Recommendations for Child-Focused Programming

Strengthening carryover of program messages with parents and caregivers should be a goal of child-focused nutrition education programs. To this end, it is recommended that SNAP-Ed program implementers build on the lessons learned through this evaluation and focus on the improvement of child-focused programs by

implementing the following recommendations. Establishing strong working relationships with intervention staff is key to the promotion of program goals.

- Focus on training and monitoring to promote program fidelity and quality.
- Use multiple methods of nutrition education delivery to maximize parent and caregiver reach and engagement.
- Offer greater support and increased communication from SNAP-Ed program staff to help facilitate greater involvement and support from intervention site staff, including ongoing program reinforcement by teachers.
- Communicate solutions for addressing low-income families' food cost concerns to help families find ways to purchase food economically.

2. Recommendations for Senior-Focused Programming

The objective of the ESLS program is to increase the fruit and vegetable consumption and physical activity of seniors aged 60 to 74. Based on the results of the independent evaluation, the ESLS program had a significant impact on participants' average daily consumption of fruits and vegetables individually and combined.

The following recommendations build on the positive outcomes of the program and further strengthen this nutrition education program for seniors:

- Establish strong partnerships with senior site administrators and managers to assist in recruiting senior participants for ESLS.
- Recruit seniors for ESLS in a way that is closely aligned with recommended age range.
- Find ways to motivate ESLS participants to complete program take-home activities. This strategy will assist in promoting positive behaviors and set the stage in class to discuss barriers and challenges to purchasing, preparing, and consuming fruits and vegetables.

3. Recommendations for SNAP-Ed Evaluation

Based on the assessment of the Wave II self-evaluations and the assessment conducted for Wave I (USDA, 2012) and considering the types of resources and staff typically available to SNAP-Ed IAs, the following recommendations are offered for improving the impact evaluations conducted by SNAP-Ed IAs.

- Determine the anticipated size of the program impact on the target audience before conducting the intervention.
- Use a comparison/control group and, to the extent possible, randomly assign units to the treatment or comparison/control group.
- Determine the minimum sample size needed for the evaluation study.
- Use survey instruments demonstrated to be valid, reliable, and sensitive to change.
- Establish standardized procedures for data collection and quality control.
- Match the analytic strategies to the characteristics of the evaluation design.

A range of potential evaluation methodologies is available, so the challenge to SNAP-Ed evaluators is to design an approach that eliminates plausible alternatives of program effects and allows the establishment of causality between the intervention and the dietary behavioral outcomes, within the resource constraints.

According to the *Food Stamp Nutrition Education Systems Review*, 43 percent of IAs surveyed in 2004 identified lack of funds and expertise on the part of their local project staff and subcontractors as significant barriers to conducting successful evaluations (USDA, 2006). Thus, some IAs may need to secure additional funding (e.g., joint State funding, grant funding) and, if feasible, consider partnering with evaluators or statisticians at a local university to aid in conducting a rigorous impact evaluation.

Chapter I • Introduction

A. Background

Nutrition education is an optional component of the Supplemental Nutrition Assistance Program (SNAP), known as SNAP-Education or SNAP-Ed. The goal of SNAP-Ed is to improve the likelihood that SNAP participants and persons eligible for SNAP will make healthy food choices within a limited budget and choose physically active lifestyles.

SNAP-Ed Guidance also encourages all States to evaluate the effectiveness of their SNAP-Ed interventions. This can include formative, process, outcome, and impact evaluations.[6] In Federal Fiscal Year (FY) 2004, 74 percent of SNAP-Ed implementing agencies (IA) reported that they conducted outcome evaluations on at least some aspects of services. However, based on interviews with 17 IAs, these evaluations were focused to a greater extent on program use than they were on impact evaluation (i.e., measuring participant behavior change) (U.S Department of Agriculture [USDA], 2006). As the largest USDA funding source for nutrition education, FNS, States, and local IAs have a significant stake in ensuring that SNAP education meets FNS' goals.

B. Evaluation Objectives and Research Questions

This *SNAP Education and Evaluation, Wave II Study*[7], is the second of two FNS-initiated independent evaluations designed to identify potential models of effective SNAP education and evaluation. The overarching goal of this evaluation is to determine whether the selected projects can serve as good examples of effective nutrition education and promotion activities within SNAP-Ed by meeting the following criteria:

- Positively impacting the nutrition and health behaviors of SNAP participants while adhering to FNS' SNAP-Ed Guiding Principles,
- Exhibiting the potential to serve as models of effective nutrition intervention for large segments of the SNAP audience while requiring levels of resources that are manageable by a large percentage of SNAP-Ed IAs, and
- Providing methodologically robust yet logistically practical examples of project-level SNAP-Ed evaluation.

To accomplish the study goal, three complementary assessments were conducted: a process evaluation, an impact evaluation, and an assessment of the IA's own impact evaluation. Exhibit I-1 lists the broad research questions framing the design and measures used in each component of the evaluation.

[6] Prior to 2007, the SNAP-Ed State Plan guidance encouraged States to evaluate the effectiveness of their nutrition education programming and provided links to evaluation resources and tools. In 2007, USDA expanded the guidance to encourage the use of control or comparison group so that the impact of the program could be assessed and set a specific threshold for funding approval for impact evaluations (USDA, 2007b).

[7] The individual case study reports for each demonstration project are published separately and included in the reference list at the end of this report. They are available at http://www.fns.usda.gov/research-and-analysis.

Exhibit I-1. Research Questions

Process Evaluation

- What were the demonstration project's overall objectives and approach?
- How was the intervention implemented and administered?
- How many people did the intervention reach, and how much exposure did participants have to it?
- What resources and costs were needed for the design and implementation of the intervention?
- What were the facilitators, challenges, and lessons learned regarding implementation and administration of the intervention?
- What feedback did participants have about the implementation of and their satisfaction with the intervention?

Impact Evaluation

- What was the intervention's impact on the primary nutrition behavioral outcome—cups of fruits and vegetables consumed (and, in the case of BASICS, use of 1 percent or fat-free milk)?
- What was the intervention's impact on secondary outcomes (e.g., eating a variety of fruits and vegetables each day)?

Assessment of the Demonstration Project's Self-Evaluation

- How did the demonstration project's actual evaluation compare with their planned evaluation?
- What were the resources needed and costs of the evaluation?
- What were the results of the self-evaluation, and how did they compare with the independent impact evaluation?
- What were the lessons learned?

C. Demonstration Project Selection Process

In FY 2009, FNS issued a request for applications to States to propose models of SNAP-Ed and participate in the FNS-funded independent evaluation. Applicants proposed various program and evaluation designs with women, children, or senior citizens as their primary target audiences. Numerous applications were received, including ongoing SNAP-Ed programs, modifications to existing programs, and new programming models. In a competitive selection process, each application was scored and ranked by an independent technical review panel chaired by FNS. The criteria used for scoring proposals are displayed in Exhibit I-2. Chapter II provides an overview of the three projects selected for the Wave II study and their similarities and differences.

Each of the three selected IAs implemented its SNAP-Ed demonstration project in FY 2012 and conducted a self-evaluation supported by SNAP-Ed administrative funds and State and local matching resources. Each SNAP-Ed IA received a $100,000 incentive to offset expenses incurred as a result of their participation in this study, including expenses associated with facilitating access to data needed for the independent evaluation, such as recruiting SNAP-Ed participants, participation in key-informant interviews, record keeping, and providing documents describing the implementer's SNAP-Ed intervention and evaluation processes.

Exhibit I-2. Scoring Criteria Used for Demonstration Project Selection

Criterion	Specific Requirements
Quality of intervention plan *(35 points)*	• Incorporates SNAP-Ed Guiding Principles • Budgets are provided per SNAP-Ed annual guidance
Intervention schedule fits the proposed FNS data collection period *(10 points)*	• Intervention will begin and end sometime between October 2011 and June 2012
Suitability for an FNS evaluation using a rigorous impact evaluation design *(30 points)*	• Can support the random assignment of multiple units (e.g., person, classes) to treatment and control conditions or the quasi-experimental, nonrandom assignment of matched units to both treatment and control groups • If other nutrition education or promotions are delivered to the target audience, then they are delivered to both the treatment and control groups during the course of the project
Promise for replication *(15 points)*	• Does not require unusually high levels of resources and technical expertise • Materials and curricula are or can be made readily accessible to other nutrition educators
Quality of staff and staffing plan *(10 points)*	• Individuals with key project responsibilities are identified, and their allocated hours are indicated and adequate • Proposed staff are well qualified, and planned training is provided

D. Purpose and Organization of the Integrated Findings Report

This report integrates key findings from the three case studies describing the results of the independent evaluation of the Wave II demonstration projects and the independent assessment of the self-evaluations by the IAs.[8] This report highlights the commonalities and differences and cross-cutting themes from the process and impact evaluation findings that may have implications for future SNAP-Ed programming and evaluation. Outlined below are the topics addressed in each of the remaining chapters of this report:

Chapter II: Overview of Demonstration Projects

Chapter III: Summary of Evaluation Methodology

Chapter IV: Integrated Process Evaluation Findings

Chapter V: Integrated Impact Evaluation Findings

Chapter VI: Integrated Findings from the Assessment of the Self-Evaluations

Chapter VII: Discussion and Recommendations

Following these chapters are two appendices that summarize the designs used for the FNS independent impact evaluation for each demonstration project and the instruments used to develop the parent and adult evaluation surveys.

[8] The individual case study reports for each demonstration project are published separately and included in the reference list at the end of this report. They are available at http://www.fns.usda.gov/research-and-analysis.

Chapter II • Overview of Demonstration Projects

A. Description of the Demonstration Projects

The following projects were selected for this second wave of the FNS SNAP Education and Evaluation Study:

- **The Iowa Nutrition Network's (INN) Building and Strengthening Iowa Community Support for Nutrition and Physical Activity (BASICS) Program;**
- **The University of Kentucky Cooperative Extension's (UKCES) Literacy, Eating, and Activity for Primary School-Aged Children 2 (LEAP2) Program; and**
- **The Michigan State University Cooperative Extension's (MSUE) Eat Smart, Live Strong (ESLS) Program.**

Two of these projects (BASICS and LEAP2) implemented child-focused SNAP-Ed programs in school settings. While there are variations in their nutrition education messages, modes of delivery, and dosage, both child-focused programs aimed to increase children's consumption of fruits and vegetables. In each of these programs, the core of the curriculum was implemented through direct education lessons in the children's regular classrooms, with take-home materials and activities targeted to parents and caregivers. For the purpose of this study, BASICS was offered in two ways. The BASICS intervention delivers nutrition and physical activity education through a school-based program. The BASICS Plus intervention added a multichannel nutrition education social marketing program to the school-based BASICS intervention.

The ESLS program differed from the other two programs in that its target audience was adults aged 60 to 74. The behavior-related goals of the ESLS program are to increase consumption of fruits and vegetables and physical activity. Conducted at senior centers and other locations where seniors gather, ESLS provided direct education with take-home materials and activities.

The three demonstration projects also varied in their nutrition education programs' relative maturity. BASICS has been implemented by INN for more than a decade, making it the longest-running program of the three demonstration projects, whereas the LEAP2 program was implemented for the first time during the study. The ESLS program, developed by FNS eight years ago, had not been widely used by MSUE educators until the start of this study. The demonstration projects were also diverse in their geographic scope, ranging from an implementation area of a single metropolitan area or county to multiple counties situated within the State. For this reason, the number of implementation sites differed by demonstration project.

An overview of the key characteristics of each of these programs, including their goals, program content, eligibility criteria, and number and type of intervention sites, are provided below. Key aspects of the three demonstration projects are summarized at the end of this chapter in Exhibit II-1. Understanding cross-project similarities and differences is important in the context of this evaluation because they influenced (1) the extent to which common facilitators and challenges to program implementation could be identified and (2) the designs of the independent impact and process evaluations.

1. INN's BASICS Program

The BASICS curriculum was developed and first implemented in the third grade by the INN in 2002 as a SNAP-Ed program targeted to lower elementary schoolchildren. The program is administered at the State level by the Iowa Department of Public Health (IDPH) and locally through subcontracting agencies. These agencies employ and directly supervise the direct educators who implement the program. To be eligible to participate in the program, schools must have at least 50 percent of the students participating in the free- and reduced-price meals. The behavior outcome goals of the program are as follows:

- Increase children's consumption of fruits and vegetables.
- Increase children's consumption of 1 percent or fat-free milk.

The design of the BASICS intervention is grounded in the social cognitive theory model of behavior change, which specifies a core set of determinants, the mechanism through which they work, and the optimal ways of translating this knowledge into effective health practices (Bandura, 2004). The primary assertion is that an individual's personal characteristics, environment, and behavior are constantly interacting with and influencing each other through a process called reciprocal determinism (Baranowski et al., 2000). Thus, to achieve the desired outcomes of improving dietary habits and increasing physical activity, the BASICS and BASICS Plus interventions (1) include both direct and indirect education methods targeted to school children, their parents or caregivers, and other adults who are influential role models for children and (2) shape the policies and practices in the environment.

The **BASICS** program, implemented in Council Bluffs and Waterloo, includes the following complementary components:

- **Direct education for children.** The BASICS curriculum includes eight lessons, each with detailed lesson plans and activities that the direct educators use to provide a series of classes for children. Classroom teachers provide the equivalent of four additional or supplemental lessons, which are incorporated into their curriculum. The direct educators provide support to the classroom teachers incorporate the supplemental lessons.
- **Indirect education to parents and caregivers provided through take-home materials and activities.** At the end of each lesson, children take home materials that introduce families to the lesson of the day and include activities the adults can complete with their children, along with corresponding informational worksheets on specific nutrition topics intended to extend the lesson to the home.
- **Training for classroom teachers.** The BASICS direct educator works with each classroom teacher to support incorporation of the supplemental lessons. The classroom teachers are also asked to stay in the classroom during the direct educator–taught lessons so they could participate in the in-classroom activities.

The **BASICS Plus** program, implemented in Des Moines, adds a **social marketing campaign**:

- **Social marketing campaign.** To extend nutrition education and physical activity messaging, INN provided messages through retail outlets, billboards, bus shelters, and radio and TV stations. This marketing campaign, as well as such events as Family Night Out events, provided opportunities to reinforce the messages children and their parents and caregivers received via school-based direct and indirect education.

The intervention was conducted from November 2011 to May 2012. During that time, the BASICS and BASICS Plus interventions reached 1,244 third-graders across 55 classrooms and more than 1,244 parents and caregivers through take-home materials and activities. In 27 classrooms in Council Bluffs and Waterloo, 613 third-graders and their parents and caregivers were reached.[9] In 28 classrooms in Des Moines, 631 third-graders and their parents and caregivers were reached.[10] Through the social marketing campaign in Des Moines, the estimated reach also included 3,054 family members.[11]

2. UKCES' LEAP2 Program

The principal goal of the LEAP2 program is to increase consumption of fruits and vegetables among primary school-age children in the first, second, and third grades. The LEAP2 program is an expansion of the Literacy, Eating, and Activity for Preschool Youth Health (LEAP) program, which was developed in 2004 through a collaboration of partners that included the Kentucky Department of Education, the Kentucky Cabinet for Health and Family Services, and UKCES. The LEAP program was developed to address three risk factors among preschool youth in Kentucky: low education levels, low consumption of fruits and vegetables, and low physical activity levels. The program was extremely popular with preschoolers, and in 2008 the LEAP program was modified to include 12 lessons designed for primary school-aged students (LEAP2). The intervention evaluated for this demonstration project consisted of 8 of the 12 LEAP2 lessons focused on fruit and vegetable consumption.

The two project-level goals of the LEAP2 program are as follows:

- Increase primary students' willingness to try fruits and vegetables.
- Increase primary students' consumption of fruits and vegetables.

To achieve these goals, the LEAP2 program targets students through the program's classroom components and targets caregivers through a take-home newsletter that is designed to increase caregiver involvement in supporting fruit and vegetable consumption. Like the BASICS program, LEAP2 program developers drew on social cognitive theory to develop the LEAP2 curriculum. This theory acknowledges the influence of environmental and personal experience to explain learning. Social cognitive theory asserts that humans learn behaviors through observation, modeling, and such motivations as positive reinforcement (Bandura, 1986). LEAP2 program developers predicted that being shown positive and fun experiences of eating fruits and vegetables through the use of storybooks, as well as tasting and enjoying new foods and participating in reinforcing activities during lessons, would have a positive effect on students' intake of fruits and vegetables. They also theorized that indirect education aimed at the caregivers would impact the environment of the children and encourage healthy eating patterns at home. Program developers noted that the use of stories and characters to model good nutrition habits has been shown to enhance fruit and vegetable consumption in studies (Byrne & Nitzke, 2002; Cornell University. Food and Brand Lab, 2009).

The LEAP2 program includes the following components.

[9] Assumed one parent/caregiver per child reached.

[10] Assumed one parent/caregiver per child reached.

[11] The number of family members reached by the BASICS Plus program for the purpose of calculating the per-participant cost of the social marketing campaign is based on a household size of 4.84. The calculation is thus 631 BASICS Plus child participants *x* household size of 4.84, providing an estimated total reach of 3,054.

- **Eight direct education lessons delivered in the classroom setting.** Eight 30-minute weekly lessons, based on children's storybooks and administered in the classroom, are taught by UKCES staff, county-based Nutrition Education Program assistants. Each lesson includes three components: a storybook reading, a reinforcing physical activity, and a recipe tasting featuring fruits and/or vegetables. Throughout the lesson, educators use discussion questions to engage the children and reinforce the LEAP2 messages.
- **Daily fruit and vegetable recall calendar.** Children complete a daily log to record the amount of fruits and vegetables they consumed on the previous day. The fruit and vegetable calendar activity is facilitated daily by the classroom teacher and is designed to focus students' attention on their fruit and vegetable intake.
- **Indirect education provided through take-home materials.** A caregiver newsletter is sent home with each child after the LEAP2 lesson. The LEAP2 newsletter contains information for caregivers that is relevant to the key messages of each lesson and includes a simple low-cost recipe that uses fruits and vegetables. The newsletter is designed to help caregivers support messages received by children during the classroom lessons and to help caregivers increase at-home offering and consumption of fruits and vegetables.

For this evaluation, the LEAP2 program was implemented by UKCES in 42 classrooms in eight schools within two counties in Kentucky. The intervention was conducted from November 2011 to February 2012.

3. MSUE's ESLS Program

The goal of ESLS is to provide nutrition and physical activity education with the intent of increasing the likelihood that SNAP eligible people aged 60 to 74 will make healthy food choices consistent with the Dietary Guidelines for Americans. The curriculum was first developed more than eight years ago by FNS and implemented by State nutrition programs around the country. The BEHAVE framework[12] was used to guide the development of the ESLS intervention and implementation strategies. The purpose of the BEHAVE framework is to strengthen the strategic thinking that contributes to project design, research, monitoring, and evaluation. The framework facilitates the complex decision-making that goes into project design for behavior change.

The ESLS intervention focuses on two key behaviors and uses evidence-based, behavior-focused strategies to promote these behaviors, including the following:

- Eat at least 3½ cups of fruits and vegetables per day.
- Perform at least 30 minutes of moderate intensity physical activity most days of the week.

To achieve these outcomes, ESLS includes the following complementary components.

- **Direct education for senior citizens in senior centers and senior housing.** The four-lesson curriculum is delivered by MSUE nutrition educators and is designed to motivate participants and build skills related to consuming the recommended amount of fruits and vegetables and performing physical activity each day. Lesson activities include self-assessment tools to assist participants in setting and achieving eating and physical activity goals and track progress. Each

[12] Academy for Educational Development, Center for Global Health Communication and Marketing. *Applying the BEHAVE framework: A workshop on strategic planning for behavior change in child survival*. Retrieved from http://www.globalhealthcommunication.org/tool_docs/54/the_behave_framework_-_full_text.pdf.

core lesson is designed to take approximately 30 minutes, with an added 10 minutes each at the beginning and end of each lesson during which the nutrition educator leads the participants through a series of simple exercises that are included in the curriculum.

- **Indirect education in the form of supplemental take-home educational materials that reinforce lesson messaging.** The ESLS take-home materials and activities extend and expand the information provided in the four lesson-based sessions. Included in the take-home materials are such activities as goal setting and tracking the consumption of fruits and vegetables—activities thought to promote behavior change. Participants received activity sheets at the conclusion of each of the four lesson-based sessions to assist with setting goals and tracking the amount of fruits and vegetables eaten each day. Some participants brought their completed activity sheet to the next lesson and shared anecdotes about meeting their goals with other participants.

The intervention was conducted from March 2012 to July 2012. During that time, the ESLS program reached 326 seniors in 18 senior centers in 13 counties.[13]

B. Commonalities and Differences Across the Demonstration Projects

Exhibit II-1. Comparison of Demonstration Projects' Key Program Features

Feature	BASICS (INN)	LEAP2 (UKCES)	ESLS (MSUE)
Implementing agency type	State Department of Public Health	Cooperative Extension	Cooperative Extension
Year first implemented	2010 (revised version)	2009	2012
Theoretical framework	Social Cognitive Theory	Social Cognitive Theory	BEHAVE Framework
Behavioral goals and objectives	Increasing children's consumption of fruits and vegetables for snacks; increasing children's choice of milk at meals and snacks (choose 1% or fat-free milk most often)	Increasing children's willingness to try fruits and vegetables and consumption of fruits and vegetables	Increasing seniors fruit and vegetable consumption and increasing amount of time spent in physical activity
Intervention sites (number)	Elementary schools with at least 50% of children eligible for free or reduced price meals in the National School Lunch Program (n = 11 for BASICS; n = 11 for BASICS Plus)	Elementary schools with at least 50% of children eligible for free or reduced price meals in the National School Lunch Program (n = 8)	Senior centers with at least 50% of seniors eligible for SNAP (n = 18)
Geographic scope	BASICS—Council Bluffs and Waterloo, Iowa; BASICS Plus—Des Moines, Iowa	2 counties in Kentucky: Laurel and Perry	13 counties in Michigan
Target SNAP-Ed audience	Children in 3rd grade and their parents/caregivers	Children in 1st to 3rd grades (primary) and their parents/caregivers (secondary)	SNAP-eligible seniors, ages 60 to 80[14]

[13] MSUE conducted the intervention and evaluation study in one additional center in which the independent evaluator did not collect data because it was added after the cutoff date for data collection.

Feature	BASICS (INN)	LEAP2 (UKCES)	ESLS (MSUE)
Education delivery channels	Classroom lessons for children; take-home materials and activities for children to complete with parents/caregivers; posters and banners in schools Basics Plus included a multichannel social marketing campaign	Classroom lessons for children; daily fruit and vegetable recall activity for children; take-home newsletter for parents/caregivers	Direct education lessons for seniors; take home materials and activities
Planned per-participant exposure to lessons	Children: 8 lessons (30 minutes each) plus classroom teacher-led extended activities [15]	Children: 8 lessons (30 minutes each)	Seniors: 4 lessons (40 minutes each)

[14] The age eligibility criterion for the evaluation study was expanded to 60 to 80 years, because MSUE was unable to recruit enough 60- to 74-year-old participants for the study. Refer to exhibit III-6 for summary of evaluation designs and information on sample sizes.

[15] Extended classroom-teacher materials given to the teachers are the equivalent of four nutrition lessons. Teachers are encouraged to integrate the materials into their classroom curriculum without any guidance on amount of time they spend.

Chapter III • Summary of Evaluation Methodology

A. Overview

This chapter summarizes the methodologies employed to conduct the process evaluation, impact evaluation, and assessment of the self-evaluations for the three Wave II SNAP-Ed demonstration projects. The sections that follow highlight the commonalities and differences in the research designs, evaluation approaches, and data collection methods across the three projects. In designing and carrying out the study, similar and standardized approaches were implemented and the same primary impact measures were used to support comparisons across the projects. At the same time, the evaluations were tailored, as necessary, to address and capture each project's unique objectives, curriculum, target audiences, and intervention approaches. Where possible, the independent evaluator capitalized on opportunities to reduce respondent burden by coordinating some of the independent evaluation efforts with those of the projects' self-evaluations while avoiding contamination of the two separate evaluations. This study's methods and data collection instruments were reviewed and approved by the U.S. Office of Management and Budget in June 2011.

B. Process Evaluation Methodology

The broad process-focused research questions described in Chapter I guided the design of this component of the evaluation. To address the research questions, it was necessary to gather both objective and subjective information. As such, the process evaluation team acquired and assessed data from primary and secondary data sources using multiple methods, including data abstraction; in-depth, open-ended interviews with stakeholders; direct observation where applicable; and focus groups with parents or caregivers of students or interviews with adult participants.

1. Data Sources

Secondary data sources that were collected and reviewed as part of the process evaluation varied somewhat by demonstration project. Examples of these secondary data sources are provided in Exhibit III-1. These secondary sources offered descriptive, objective information on key aspects of the demonstration projects' design and implementation and can be categorized into four groups: planning and reporting documents, implementation documents, administrative data on program reach and dosage, and program costs.

Across the three demonstration projects, primary data were collected from five types of key informants: program-level staff members, direct educators, intervention site administrators (school principals or senior center directors), intervention site classroom teachers, and senior center program participants or the parents and caregivers of children who participated in the school-based interventions. Direct observation of the interventions by evaluation team members provided additional supplemental data. Data collection from key informants took place approximately one month before the start and immediately following completion of the interventions. Interviews were conducted during both periods with most staff members and administrators. Information about the types of respondents for each demonstration project is presented in Exhibit III-2.

Exhibit III-1. Secondary Data Collected for the Process Evaluation of the Demonstration Projects

Document Category	Specific Documents Reviewed
Planning and Reporting Documents	• Demonstration project application • FY 2012 SNAP-Ed Plan
Implementation Documents	• Nutrition education curriculum and lesson plans • Nutrition education materials • Training curriculum and protocols • Quality assurance documentation • Social marketing plans (INN) • Social marketing materials and products (INN) • Fruit and vegetable recall calendar (UKCES) • Parent newsletters (UKCES) • Implementation schedule (UKCES) • Focus group discussion guides (MSUE and UKCES)
Administrative Data on Program Reach and Dosage	• Demographic information on program participants • Planned and actual number of children in the direct education interventions at each site (INN and UKCES) • Planned and actual number of seniors in the direct education intervention at each site (MSUE) • Planned and actual number of direct and indirect contacts for social marketing campaign (INN) • Documentation of media impressions,[a] signage, duration, implementation schedule by channel, and potential exposure (INN) • Type of educator implementing the direct education at each site • Activity logs documenting lesson duration and implementation schedule
Program Costs[b]	• Standardized cost tables consistent with FNS SNAP-Ed expenditure reporting requirements

[a] Media impressions are the number of people who may have seen an article, heard something on the radio or in a podcast, watched something on television, or read something on a Web page or blog.

[b] The independent evaluator provided each demonstration project with the same resource and expense tracking form to ensure that cost data were reported consistent with SNAP-Ed annual reporting requirements and in a standardized format.

Exhibit III-2. Number of Respondents and Data Collection Methods for Each Respondent Type, by Demonstration Project

Type of Respondent	Data Collection Method	BASICS (INN)	LEAP2 (UKCES)	ESLS (MSUE)
Program Staff				
Program-level staff members	Interview	8	11	4
Intervention Site Staff				
Direct educators	Interview	3	6	n/a
	Questionnaire	n/a	n/a	14
Classroom teachers	Questionnaire	26	39	n/a
	Interview	7	12	n/a
School Principals (*post-intervention only*)	Interview	6	4	n/a
Senior center managers (*post-intervention only*)	Interview	n/a	n/a	6
Retail store managers (*post-intervention only*)	Interview	5	n/a	n/a
Program Participants				
Senior participants or parents and caregivers of child participants	Focus groups[a]	25	28	53
	Survey	513	395	263

[a] Number of individual participants in focus groups.

n/a = not applicable

2. Instrumentation

Trained data collectors used standardized secondary data abstraction tools and primary data collection instruments designed for the evaluation of each project. The wording of questions in each key-informant interview guide and the focus group discussion guide were tailored to the specific activities of each project. The key-informant interviews included relevant, probing questions to allow for in-depth discussions of important issues or topics.

3. Analysis Approach

Interview responses from key informants, including program-level staff, direct educators, intervention site administrators, classroom teachers, and adult program participants where applicable, were compiled into a master Microsoft Word 2007 document and organized by broad process evaluation research questions and process indicators. This approach helped to organize the extensive amount of information that was available and allowed for the identification of broad themes (e.g., implementation challenges) and specific topics (e.g., lesson plan scheduling) as well as agreement and disagreement among respondents. Direct quotations were also identified where relevant and used to support key findings.

Quantitative analyses were conducted on program reach and dosage from the program administrative databases provided by the three demonstration projects. SAS 9.3 was used to analyze program dosage, participant satisfaction, and factors affecting program access. The cost data were analyzed based on

information reported by the demonstration projects in a series of standardized tables consistent with FNS SNAP-Ed expenditure reporting requirements.

Transcripts from focus groups with parents or caregivers of students or senior participants were coded in QSR International NVivo version 8, which let the evaluation team systematically organize, process, and summarize information provided by this key stakeholder group. It also allowed the capture of the breadth of opinions offered by focus group participants while identifying common themes and issues and relevant direct quotations.

C. Impact Evaluation Methodology

1. Conceptual Framework for the Impact Evaluation

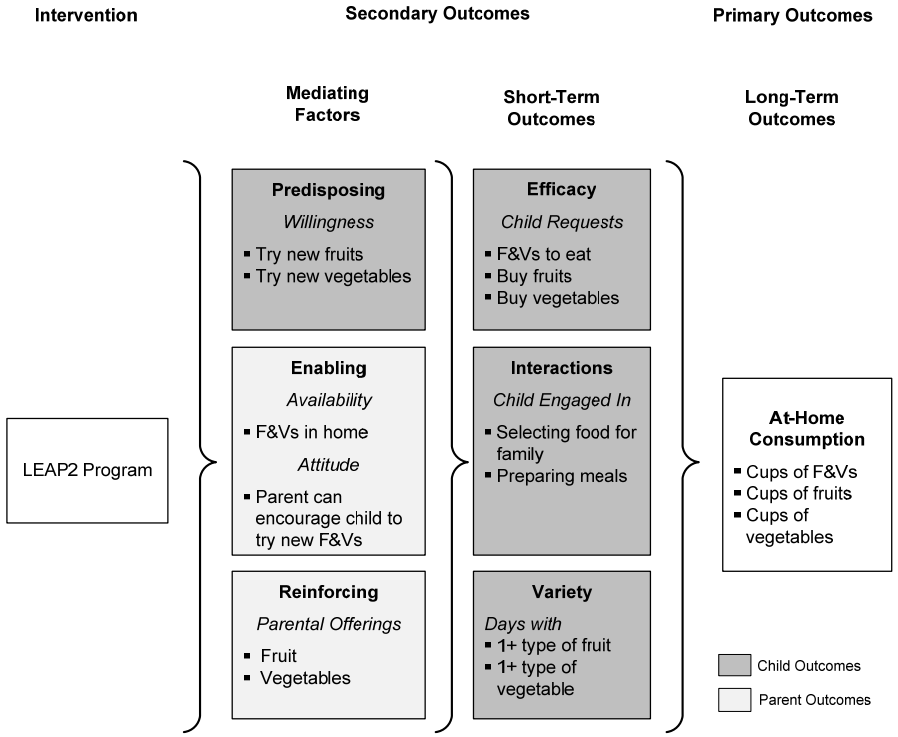
To provide an integrative understanding of the impacts of each demonstration project's program, the impact analysis was guided by a conceptual framework that helped track the range of potential program effects. The framework enabled the evaluation of the program's effects by specifying secondary outcomes that link the intervention to the long-term, primary outcome of average daily consumption of fruits and vegetables. The secondary outcomes capture, in greater detail, some of the complexity of the behavior change process for fruit and vegetable consumption. The greater the number and strength of the changes seen among the secondary outcomes, the greater the likelihood of observing changes in fruit and vegetable consumption (Green, Kreuter, Deeds, & Partridge, 1980).

Figure III-1 shows the framework used for the impact evaluation of UKCES' LEAP2 program. A similar framework was used for the other two demonstration projects. This framework was adapted from Green et al. (1980) and has been applied in other studies to capture the main types of secondary outcomes associated with changes in nutrition behavior (Mullen, Hersey, & Iverson, 1987). The secondary outcomes include mediating factors and short-term outcomes. Three main types of mediating factors can influence changes in dietary consumption:

- **Predisposing factors** include the knowledge and attitudes of an individual related to the motivation to act. For the LEAP2 evaluation, an example of a predisposing factor is the willingness of a child to try new fruits and vegetables.
- **Enabling factors** include the skills and resources needed to engage in healthy nutrition practices. For the LEAP2 evaluation, an example of an enabling factor is the availability of fruits and vegetables in a child's home.
- **Reinforcing factors** include factors that help reinforce healthy nutrition. For the LEAP2 evaluation, an example of a reinforcing factor is a parent offering fruits and vegetables for snacks or at dinner.

For the LEAP2 impact evaluation, these mediating factors could affect dietary-related behaviors that are short-term outcomes (e.g., the child eating a variety of fruits and vegetables each day). These short-term outcomes are directly related to lessons in the LEAP2 curriculum. For example, according to the model, greater willingness to try new fruits and vegetables may influence the frequency with which a child eats a variety of fruits and vegetables. Changes in these short-term outcomes might in turn influence at-home consumption of fruits and vegetables. As described in the next section, the mediating and short-term outcomes were similar for the other demonstration projects, with a few differences based on the specific curriculum used in the intervention.

Figure III-1. Conceptual Framework for the LEAP2 Program Impact Evaluation



Source: Green, L. W., Kreuter, M. W., Deeds, S. G., & Partridge, K. B. (1980). *Health education planning: A diagnostic approach*. Palo Alto, CA: Mayfield Publishing Co.

This conceptual framework is helpful in tracking the impacts of each program, but it is not intended to represent a comprehensive logic model because the program could also affect consumption through other pathways that are not reflected in this framework. Nonetheless, using this conceptual framework helps provide a fuller evaluation of the impacts of each program.

2. Summary of Primary and Secondary Outcome Measures

a. Primary Outcome Measures

As shown in Exhibit III-3, the primary outcome measure for the three demonstration projects was average daily consumption of fruits and vegetables. For the two child-focused demonstration projects (BASICS and LEAP2), measured consumption was limited to at-home consumption because parental reports were used to collect information on the child's consumption at baseline and follow-up. Based on FNS' interest in observing a minimum increase in dietary intake of 0.30 standard deviation units, it was hypothesized that children participating in these programs would increase their average daily at-home consumption of fruits and vegetables combined by approximately 0.30 cups per day compared with children not exposed to the programs.[16] For the BASICS intervention, an additional primary outcome measure was the child's use of 1 percent or fat-free milk during the past week.

[16] Anticipated program impacts are often described in terms of standard deviations, which provide a unit-free measure of anticipated change and are useful when different measurement tools or populations are involved. Unit-free measures can then be transformed into any appropriate metric (e.g., cups) based on the characteristics of the applied data collection tools.

Exhibit III-3. Primary Outcome Measures, by Demonstration Project

Measures	BASICS (INN)[a]	LEAP2 (UKCES)[a]	ESLS (MSUE)
Cups of fruits consumed each day	✓	✓	✓
Cups of vegetables consumed each day	✓	✓	✓
Cups of fruits and vegetables consumed each day	✓	✓	✓
Used 1% or fat-free milk during past week (drank or used on cereal)	✓		

[a] Consumption was limited to at-home consumption, because parental reports were used to collect information on the child's consumption at baseline and follow-up.

Similar to the two child-focused demonstration projects, the primary outcome measure for the MSUE ESLS demonstration project was average daily consumption of fruits and vegetables. Based on FNS' interest in observing a minimum increase in dietary intake of 0.30 standard deviation units, it was hypothesized that seniors participating in the program would increase their average daily consumption of fruits and vegetables by approximately 0.30 cups per day, compared with seniors not participating in the program.

b. Secondary Outcome Measures

Secondary outcomes reflect the attitudes, beliefs, and behaviors that would be expected to change in order to facilitate increased fruit and vegetable consumption. These measures are important because they can provide information to program developers and other interested parties that can be used to identify strengths and weaknesses in the program theory and execution. Conceptually, they are closely aligned with the intervention theory and materials and vary somewhat from program to program. Therefore, the project team reviewed the curriculum for each program to identify the secondary outcome measures to include in the impact evaluation.

As shown in Exhibit III-4, secondary outcome measures common to the two child-focused programs included the following:

- Variety—eating more than one type of fruit or vegetable each day,
- Willingness—willingness to try new fruits and vegetables,
- Child requests—the child asking the parent to buy certain fruits or vegetables,
- Availability—the average weekly at-home availability of fruits and vegetables, and
- Parental offerings—the frequency of parental offerings of fruits or vegetables for a snack and at dinner.

Exhibit III-5 lists the secondary outcome measures for the evaluation of MSUE's ESLS program.

3. Summary of Impact Evaluation Approaches

Designing the impact evaluation approach for each demonstration project required consideration of a number of factors. First, the independent evaluator considered the uniqueness of each demonstration project, including the characteristics of the intervention, the design of the IA's impact evaluation and the IA's data collection procedures so that the independent evaluation did not contaminate the IA's implementation of its intervention or self-evaluation. Additionally, the independent evaluator considered

FNS' requirements for the study, which included establishing causality between the interventions and the dietary behavioral outcomes. This consideration required balancing an approach that can establish causality within the limitations imposed by delivering nutrition education through a public program.

Exhibit III-6 summarizes the impact evaluation approaches for the three demonstration projects. (Exhibits A-1 through A-3 in Appendix A list the study population, evaluation design, and sample selection; required sample size; data collection procedures; survey response; and data analysis procedures for each demonstration project.) The following sections provide a summary of the approach used by the independent evaluator to examine the impact of the three demonstration projects and discuss the similarities and differences in the approaches used.

a. Study Population, Research Design, and Sample Selection

For the two child-focused demonstration projects (BASICS and LEAP2), the study population was parents or caregivers of children participating in the evaluation study. For the ESLS program, the study population was 60 to 80 years olds who attended senior centers.

All of the evaluations used a research design that employed a comparison strategy so that plausible alternative explanations of program impact could be ruled out. A fully randomized experimental design was used for the evaluation of the LEAP2 program, and quasi-experimental designs were used for the BASICS and ESLS programs.

The evaluation for the INN demonstration project assessed the impacts of the BASICS and BASICS Plus interventions by first comparing each program to a no-treatment comparison group and then comparing the two programs to each other. Because a social marketing campaign is inherently ecological and poses risk of contamination when applied using random assignment of schools to study conditions, a quasi-experimental research design was chosen for the INN evaluation. INN assigned school districts to the treatment conditions and recruited schools in each district to participate in the study. The research design specified 11 schools in each condition, for a total of 33 schools.

The evaluation for LEAP2 included eight matched pairs of schools. Schools were matched within the two counties on school size and percentage of students receiving free and reduced-price meals. For each matched pair of schools, random assignment was made to the treatment or control group.

The initial design for evaluating MSUE's ESLS project was random assignment to the treatment or control group within strata for geographic and number of meals provided by the center. However, it was not possible to use this design because of challenges faced by MSUE in scheduling the specified number of classes at each center and recruiting age-eligible participants. During the course of program implementation and baseline data collection, MSUE added classes at larger centers and added centers within counties already included in the study so that the final design was quasi-experimental.

Sample size was estimated following commonly accepted evaluation practices (80 percent statistical power and a type I error rate of 0.05 with a two-tailed test). As previously noted, sample size estimation was based on observing a change in daily consumption of fruits and vegetables combined of 0.30 standard deviation units or better as specified by FNS. Estimates were based on a statistical model that assesses change across time between the intervention and comparison or control groups.

Exhibit III-4. Secondary Outcome Measures for the Child-Focused Interventions

Measures	BASICS (INN)	LEAP2 (UKCES)
Other dietary behaviors of children at home		
Number of days child ate more than one type of fruit during past week	✓	✓
Number of days child ate more than one type of vegetable during past week	✓	✓
Willingness to try a new kind of fruit	✓	✓
Willingness to try a new kind of vegetable	✓	✓
Frequency child asked parent to buy certain fruits during past month	✓	
Frequency child asked parent to buy certain vegetables during past month	✓	
Number of days child asked to have fruits or vegetables to eat during past week		✓
Number of days child helped select food for family during past week		✓
Number of days child helped make or cook a meal during past week		✓
Parent behavior and household variables		
Availability of fruits and vegetables at home during past week	✓	✓
Number of days parent gave fruit as snack during past week	✓	✓
Number of days parent gave fruit at dinner during past week	✓	✓
Number of days parent gave vegetables as a snack during past week	✓	✓
Number of days parent gave vegetables at dinner during past week	✓	✓
Number of days parent gave milk at dinner during past week	✓	
Number of days parent ate fruit for snack	✓	
Number of days parent ate vegetable for snack	✓	
Parent/caregiver can encourage child to try new fruits or vegetables[a]	✓	✓
Parent/caregiver usually drinks 1% or fat-free milk	✓	
Parent/caregiver believes that 1% or fat-free milk is healthier for child than whole milk	✓	

[a] Measure of parental efficacy.

Exhibit III-5. Secondary Outcome Measures for the ESLS Program

Measures
Other dietary behaviors
Availability of fruits and vegetables at home during past week
Number of days ate fruits or vegetables as snacks or between meals during past week
Number of days ate more than one type of fruit during past week
Number of days ate more than one type of vegetable during past week
Availability of potato chips, tortilla chips, corn chips, or other chips during past week
Availability of regular soft drinks or sodas during past week
Usually eats at least one fruit or vegetable at each meal
Usually eats fruit for dessert instead of having cookies, cake, pie, or ice cream
Shopping and food preparation behaviors
Sometimes ask friends or family members for help shopping for food
Can afford fruits or vegetables in the store
Buying more fruits or vegetables would be hard on budget
Add fruits or vegetables as ingredients to meals to help eat more fruits/vegetables

Exhibit III-6. Summary of Evaluation Designs for the FNS Independent Evaluations

Characteristic	BASICS (INN)	LEAP2 (UKCES)	ESLS (MSUE)
Study population	Parents/caregivers of school-aged children[a]	Parents/caregivers of school-aged children[a]	People aged 60 to 80[b]
Study design	Quasi-experimental design	Fully randomized experimental design	Quasi-experimental design
Sample size / number of respondents for impact analysis	11 schools in the BASICS group, 11 schools in the BASICS Plus group, and 11 schools in the comparison group; 726 parent respondents at follow-up	8 intervention and 8 comparison schools; 640 parent respondents at follow-up	17 intervention and 16 comparison centers; 510 respondents at follow-up
Data collection for the intervention and comparison groups	Mail survey with telephone survey of non-respondents	Mail survey with telephone survey of non-respondents	Baseline: In-person interviews (concurrent with MSUE survey administration) Follow-up: Mail survey with telephone survey of non-respondents
Data analysis	Mixed-model regressions using maximum likelihood estimation	Mixed-model regressions using maximum likelihood estimation	Mixed-model regressions using maximum likelihood estimation

[a] Parents/caregivers reported on their children's at-home nutrition behaviors.

[b] Although the ESLS program is designed for people aged 60 to 74, it was necessary to expand the eligible age range for the evaluation study.

b. Instrument Development and Testing

To develop the impact evaluation instruments, the project team assessed the appropriateness of existing instruments, as compiled for the literature review conducted for Wave I of the SNAP Evaluation and Education Study (USDA, 2012) for collecting data on the outcomes of interest. Many of the questionnaire items were taken or adapted from instruments that have been administered successfully with low-income audiences, validated, and demonstrated to be reliable and sensitive to change in previous studies (see Appendix B).

For the primary outcome measures, consumption of fruits and vegetables, questions from previously validated instruments—the Food Stamp Program Fruit and Vegetable Checklist (Townsend, Kaiser, Allen, Joy, & Murphy, 2003) and University of California Cooperative Extension Food Behavior Checklist (Townsend, Silva, Martin, Metz, & Wooten-Swanson, 2008)—were modified for the two programs targeted to children to ask the respondent (parent or other caregiver) to report on his or her child's consumption of fruits and vegetables. Respondents were instructed not to include meals eaten at school or the childcare center so that they were reporting only on observed consumption behavior. It was not necessary to modify these questions for the ESLS evaluation.

Interviews were conducted with parents and caregivers (for the two programs targeted to children) and older adults to test and refine the instruments. The readability of the instruments was assessed via the Fry test, which examines the average number of syllables and sentences per 100 words and is a commonly used measure of reading level (Fry, 1968). Generally, the questions were at a fourth- to eighth-grade reading level for the surveys for the BASICS and LEAP2 evaluations and a third- to sixth-grade reading level for the survey for the ESLS evaluation.

c. Data Collection Procedures and Response

Parents and caregivers of children who participated in the evaluation (BASICS and LEAP2) and participants (ESLS) completed a survey before and after the intervention. A multimodal survey approach was used to maximize the survey response rate, and incentives of $10 (baseline) and $15 (follow-up) were provided for completing the survey. For the BASICS evaluation, the questionnaires and other survey materials were available in English and Spanish because of the large number of Hispanic children in the evaluation study. Response rates for the parent and caregiver follow-up surveys ranged from 77 to 85 percent, and the response rate for the follow-up survey for the ESLS evaluation was 98 percent. The number of completed surveys at follow-up achieved the required sample sizes based on the power analysis calculations. Appendix A provides additional information on the data collection mode and survey response for each evaluation.

d. Analysis Procedures

i. Impact analysis

For the impact evaluations of the three programs, general linear mixed models were used for continuous impact variables, and generalized linear mixed models were used for dichotomous impact variables to evaluate program impacts while accounting for the clustering of children within schools and of participants within senior centers. These models were estimated via difference-in-difference estimates of program effect, comparing change across time (baseline and follow-up) in the intervention group with change across time in the comparison group. For the evaluations of the two child-focused programs, covariates included child age, child sex, household size, respondent race and ethnicity, respondent age,

and respondent sex. For the ESLS evaluation, covariates in the model included participant's age, sex, household size, health status, employment status, and race and ethnicity.

ii. Attrition analysis

Before conducting the impact analyses, the potential impact of attrition from the evaluation study on generalizability of the study findings was assessed by comparing the pre-intervention similarity of study participants who provided follow-up data and those who did not. This comparison was made by fitting a logistic regression model that regressed completion status on variables that describe survey responders and, in the case of programs targeted to children, the characteristics of their children. This analysis provided odds ratios that highlight any association between the descriptive characteristics of participants and the likelihood of providing data at follow-up. An attrition analysis was not conducted for the ESLS evaluation, because only two percent of participants (n = 11) did not complete the follow-up survey, resulting in insufficient non-respondents to assess their similarity to study participants who provided follow-up data.

D. Methodology for the Assessment of the Self-Evaluations

Determining the effectiveness of the evaluations conducted by the IAs required a clear understanding of the planning, design, and implementation of the evaluation. To the extent possible, the assessment was based on objective information, such as the evaluation report prepared by each IA. Qualitative methods were used to gather in-depth information and perspectives of key players in the evaluation (e.g., program administrators, the evaluation manager). Exhibit III-7 describes the data sources used for the assessment of the self-evaluations.

The assessment of the self-evaluations included a detailed description of the evaluation methodology, including management, staffing, and costs of the evaluation; an assessment of the quality of the self-evaluations, including strengths and weaknesses; a comparison of the study design and results with the FNS independent evaluation; and an assessment of lessons learned based on the quality assessment, cost analysis, and reported factors affecting evaluation implementation.

As noted in Exhibit III-7, an evaluation review form was used to assess the quality of each self-evaluation. To compare findings from the self-evaluations with a rigorous independent evaluation, a scoring tool was adapted based on the one used by the Center for Substance Abuse Prevention in developing the National Registry of Evidence-based Programs and Practices database (U.S. Department of Health and Human Services, Substance Abuse and Mental Health Services Administration, 2011).

The evaluation review form includes eight evaluation components and requires a reviewer to assign a numerical score ranging from 1 to 5 for each component, where 1 means that the component is missing or so poorly described that its value to the evaluation cannot be determined and 5 means that the component is appropriate for the program being evaluated and is presented in a way that shows that the evaluator has a clear understanding of its role in the evaluation. Scores of 1, 2, and 3 indicate components that are not aligned with the overall evaluation design such that they are unlikely to contribute useful or interpretable information. Scores in this range indicate opportunities for improvement in future evaluations. Scores of 4 and 5 indicate components that are well-matched to the design; these components are likely to contribute useful or interpretable information to the overall evaluation. Scores in this range indicate evaluation components that could be replicated in future evaluations.

Exhibit III-7. Description and Use of Data Sources for the Assessment of the Self-Evaluations

Data Source	Description and Use
Demonstration project application	The application to participate in the study provided information on the proposed evaluation procedures. The study team abstracted information from the IAs application to describe their evaluation approach and identify any differences between the planned and actual evaluation approach.
Evaluation review form	The study team used this form to assess the quality of the self-evaluation. Additional information about the development and use of this form is provided in this section.
Evaluation cost form	This form, completed by the IA, documented the resources used and costs incurred to evaluate their program. The study team used the completed form and the findings from the key-informant interviews to prepare a descriptive assessment of the cost of conducting the evaluation.
Evaluation report	The study team provided each IA with an outline for preparing a report on their evaluation methodology and results. The team reviewed and abstracted key information from the report to complete the assessment of the quality of the self-evaluations and to compare the study design and results with the FNS independent evaluation.
Key-informant interviews	Using structured interview guides, the study team conducted in-depth interviews with the principal investigator(s), evaluation manager(s), and other project staff before and after the self-evaluation. The findings from these interviews informed all aspects of the assessment of the self-evaluations, particularly the assessment of the management of the evaluation and lessons learned from conducting the evaluation.

Using the evaluation review form, two members of the impact evaluation staff (one rater was the designated impact evaluation leader for the independent evaluation) rated each evaluation component. The study team assessed inter-rater agreement and came to a consensus score for each evaluation component. As part of the scoring process, the study team identified the strengths and weaknesses or limitations of each self-evaluation and made recommendations for improving future evaluations.

Chapter IV • Integrated Process Evaluation Findings

A. Description of Key Findings on Program Implementation Across the Demonstration Projects

Based on experiences across the demonstration projects, this chapter describes and examines the similarities and differences in the implementation of the three projects and the common lessons that can be learned for future implementation of these and other SNAP-Ed programs. For example, each project relied on the cooperation of program partners, and all had challenges with recruiting and retaining adults either as the primary or secondary audience. In the two child-focused demonstration projects, recruitment was critical to secure participation and assistance from schools. In the adult-based demonstration project, recruitment was also vital to securing participation from senior centers and seniors. In the two child-focused programs, the process evaluation identified the engagement of parents and caregivers in the educational intervention as a critically important aspect of program implementation that requires additional attention and thought.

While there were common lessons learned from all three projects, there were many more similarities specific to the two child-focused programs and unique issues facing implementation of the ESLS program, including cooperation of the senior center staff, clear and frequent communication with senior centers, and strategic recruitment of ESLS target audience. Due to the particularity of the strengths, challenges, and lessons learned from the ESLS program, they are examined separately in this chapter.

Key Findings

- The structure and program content of each intervention were well received by participants and community partners.
- Staff members at senior centers and teachers at school–based intervention sites were enthusiastic about participation in the programs.
- Program partner cooperation is critical to successful program implementation across all projects.
- Finding effective methods to engage adults, whether they are the primary focus of the intervention (as in the ESLS program) or the secondary audience (as the parents' children in interventions) is essential to the promotion of behavior change.
- Multilevel interventions that include parental involvement and social marketing provide the opportunity for greater reach and dose of intervention messages.

1. Partner Engagement and Support

A common theme across all three demonstration projects was the need to engage key partners throughout the process. Garnering the cooperation of partners was critical to the successful implementation of the interventions. Partner roles varied extensively by project but generally fell into one of the following three categories: primary audience recruitment, support from intervention sites, and nutrition education delivery. Key partners and their respective roles are shown in Exhibit IV-1 and described in more detail below.

The BASICS and BASICS Plus interventions partnered with schools and school districts to implement their child-focused program. The LEAP2 program planners also partnered with schools and school districts. The ESLS program planners partnered with senior centers and senior sites to implement this curriculum.

Exhibit IV-1. List of Key Partners and Their Roles, by Demonstration Project

Project (IA)	Partner	Role
BASICS and BASICS Plus (INN)	County public health departments and school districts Direct educators from partner organizations Public health administrator in the public health department and the school food service administrator in the school district, who provided direct supervision of the direct educator(s)	• Assisting in program development and revision • Employing direct nutrition educators • Recruiting schools and classrooms for BASICS intervention • Delivering nutrition education • Working with classroom teachers to facilitate supplemental lessons
	Social marketing campaign partners included retail food outlets, TV and radio stations, Des Moines Area Rapid Transit, and billboard companies. Additional partners for the social marketing campaign included the Iowa Department of Education and Food Corps volunteers	• Assisting in delivering the social marketing campaign • Extending the reach of the social marketing campaign • Staffing and food at events
LEAP2 (UKCES)	Kentucky Cabinet for Health and Family Services and the Kentucky Department of Education	• Curriculum development
	University of Kentucky faculty partners from the School of Human Environmental Sciences and the College of Public Health	• Evaluation planning
	School administration and staff, including principals, teachers, family resource coordinators, and school food service directors	• Implementation planning • Scheduling • Evaluation planning
ESLS (MSUE)	Senior centers/sites in targeted areas of Michigan, including the Upper Peninsula	• Assistance in identifying and recruiting ESLS participants • Assistance in advertising the ESLS program in the community • Reminding potential participants about the ESLS intervention • Providing space for educational intervention

In the summer before implementation, INN met with the direct educators from partner organizations to review the existing BASICS curriculum and modify the curriculum based on direct educator experience and lessons learned. This modification resulted in an improved curriculum that was based on the direct experience of the educators. Additionally, engaging the direct educators in these curriculum modifications provided for a greater buy-in of the program.

Although conducted before the study period, INN and UKCES also engaged many partners in the formative research conducted to develop and pretest their original curricula. This research included group interviews with classroom teachers and the low-income parents of children in the target age groups. BASICS was originally developed more than 10 years ago by the INN and uses community partners to employ and supervise direct educators to provide direct nutrition education in the schools. The original LEAP2 program was developed in 2004 by a coalition that included registered dietitians and educators with representatives

from the Kentucky Cabinet for Health and Family Services, the Kentucky Department of Education, and the Kentucky Cooperative Extension Service.

Unlike the school-based programs, where the child participants were a captive audience in their classrooms, recruiting the primary target audience (low-income seniors) for the ESLS demonstration project required a much more extensive effort. To assist with this task, the MSUE county cooperative extension staff engaged a number of senior sites during this phase of the intervention. In most cases, these centers and sites played a key role in recruiting ESLS participants and providing appropriate space for conducting the ESLS sessions. These partners posted flyers advertising the ESLS program, identified potential program participants, answered seniors' questions about the program, assisted with scheduling sessions to identify the best time of day to reach participants with this intervention, and contacted seniors who may have forgotten about the program. The role of senior centers was pivotal to the success of the ESLS program.

a. Partners Supporting Onsite Program Implementation

Both child-focused programs depended on partnerships with the staff at elementary schools, including administrative staff and classroom teachers. In all cases, these partnerships were formed and the sites agreed to volunteer to participate in the intervention based on prior relationships with the IA and the program's merit and perceived value. School principals and other school administrators (e.g., assistant principals) were needed to support program implementation in a variety of ways, including securing overall support within the school for program implementation, helping SNAP-Ed program staff schedule the nutrition lessons, securing support from classroom teachers, and finding space for activities to be conducted outside the classrooms. For the ESLS program, center directors were asked to help recruit seniors for the voluntary ESLS sessions offered onsite during the intervention period.

Two IAs used partners to deliver nutrition education to their target audiences. Classroom teachers in the BASICS intervention were tasked with incorporating four supplemental lessons into their curriculum. Designed using curriculum standards, these supplemental lessons were incorporated into a variety of subjects during the intervention period. The eight BASICS lessons taught by the direct educator, along with the four supplemental lessons taught by the classroom teacher, offered a total of 12 lessons to children in the intervention groups. Although the eight LEAP2 lessons were facilitated by county cooperative extension staff, the primary school teachers were asked to facilitate a daily fruit and vegetable recall activity. Children participating in LEAP2 completed a daily log to record the number of fruits and vegetables that they had consumed on the previous day. This activity is designed to focus students on their fruit and vegetable intake. Teachers were also responsible for sending home LEAP2 newsletters with the students that targeted their parents and caregivers.

2. Target Audience Recruitment

Target audience recruitment was an essential part of all three demonstration projects. However, the type of recruitment required (e.g., intervention site, parent and caregiver, adult program participant recruitment), as well as the extent to which each partner agency was involved, varied by project.

a. Intervention site recruitment (BASICS and LEAP2)

Recruitment was a critical component of the implementation process for the two child-focused programs. Once the INN learned of their selection as a demonstration project, the program manager scheduled meetings with school administrators to promote program buy-in and encourage the schools' participation in the intervention. The UKCES program manager took a slightly different approach, relying heavily on county

cooperative extension service agents to contact school superintendents and principals to confirm their willingness to participate.

For the BASICS and LEAP2 programs, direct educators were primarily responsible for scheduling the selected classes with intervention sites and were challenged occasionally with conflicting schedules and the competing priorities of teachers.

Parents and caregivers were a secondary target audience and thus indirect recipients of nutrition education in the two child-focused programs. Therefore, engagement of parents and caregivers was attempted and, in both cases, proved to be challenging. To enhance parent and caregiver engagement in the BASICS curriculum, various take-home activities were designed for both the parent and the student to complete. The take-home activities were designed to promote discussion of how to include fruits and vegetables, low-fat milk, and physical activity into everyday life. The social marketing component included in the BASICS Plus intervention provided a multilayered approach to reaching parents and children with nutrition education. The BASICS Plus social marketing campaign was implemented in locations where Des Moines SNAP participants lived and worked. Included in the social marketing campaign were billboards, TV, radio, retail outlets, bus shelters, and Family Night Out events. To enhance parent and caregiver buy-in for the LEAP2 program, a caregiver newsletter was sent home with each child following the lesson. The LEAP2 newsletter contained information for caregivers that was relevant to the key messages of each lesson, and included the name of each storybook along with a simple, low-cost recipe that uses fruits and vegetables. The newsletter was designed to promote nutrition discussions and activities between children and their caregivers and to increase at-home offering and consumption of fruits and vegetables.

3. Number and Types of Personnel Used

The number and type of personnel used to implement the three demonstration projects varied with program design and scope. Some commonalities were observed, however, and are described in the following section, which is organized by type of staff.

a. Program Managers or Principal Investigators

Each demonstration project had one to three individuals who were generally responsible for the overall management and oversight of their program. All demonstration projects had the equivalent of three senior-level staff members operating and managing their programs and sharing related responsibilities (e.g., general administration, assisting with program design and implementation, developing the program's self-evaluation).

The number of direct educators used to deliver each of the school and senior center-based nutrition education programs varied by demonstration project. The BASICS and BASICS Plus interventions employed four direct educators who worked in 22 intervention schools. The four direct educators were employed by either a county health department or a school food service. For the LEAP2 program, five county cooperative extension service staff in two counties facilitated the LEAP2 lessons in the eight intervention schools and the control lessons in the eight control schools. One direct educator took a new position as an extension agent in another county and was replaced during the implementation period.

The ESLS program employed 20 direct educators who worked in or supervised 18 senior sites. Seven of the 20 staff were supervising educators who traveled between sites to supervise and assist if they were available. At one site, two educators co-taught each class together. The remaining 11 direct educators taught at one to three sites, depending on the number of classes held at each site and the length of travel between sites in

their area. The 20 direct educators were employed by MSUE. A summary of direct educator qualifications and the program-related training that they received is provided in Exhibit IV-2.

Exhibit IV-2. Direct Educator Qualifications and Program-Related Training, by Demonstration Project

Project (Number of Direct Educators)	Typical Direct Educator Qualifications	Training Provided to Direct Educators
BASICS (*n* = 4)	• Interest in teaching nutrition • Background in education or health sciences	• Training workshop, 2 days • Independent study, 40 hours • Ongoing monitoring and feedback from State IA
LEAP2 (*n* = 6)	• High school degree • Previous experience with teaching (e.g. Sunday school or 4-H) and ties within the community	• Orientation training on youth development, nutrition needs, and curricula, 2 days • Ongoing training, 2 days per year[17] • Up to 10 days per year of mentoring available • Formal overview of lessons • Ongoing monitoring and feedback from county extension agents
ESLS (*n* = 20)	• Some college • College degree • Master's degree	• Orientation, Web-based training • Training workshop, 2 days • Ongoing monitoring and feedback from State evaluation specialist

[17] Not all LEAP2 direct educators participated in this training.

b. Other Staff Needed for Program Implementation

Each program also identified a staff position generally described as a program coordinator. This individual was typically responsible for more of the day-to-day oversight of the program, including program development and design, recruitment, reviewing project materials, and supervising or training direct educators (if applicable). Both the BASICS and ESLS programs also employed evaluation coordinators or consultants who facilitated the preparation of institutional review board applications, the self-evaluation design and instrumentation, data collector training, data entry, and data analysis. For the LEAP2 program, within the two county cooperative extension programs administering the intervention, three extension agents were responsible for planning, scheduling, and day-to-day administration of the program. They also served as direct supervisors for the nutrition education program (NEP) assistants who administered the classroom lessons. Evaluation was designed and implemented by UKCES state-level staff.

4. Program Reach and Dosage

Across the three demonstration projects, program reach and dosage varied extensively. In all cases, the demonstration projects were designed to reach their primary target audiences through direct education. However, the BASICS Plus intervention also included social marketing messages to both a primary (children) and a secondary target audience (parents and caregivers).

Both the BASICS and LEAP2 programs also promoted nutrition education messages at the organizational level by incorporating nutrition education materials or lessons into the curricula in an effort to encourage the

reinforcement of nutrition education messages in the classrooms. The BASICS and BASICS Plus interventions further enhanced reinforcement of nutrition messages by obtaining buy-in from classroom teachers to incorporate four supplemental BASICS lessons into their curriculum in the 22 classrooms in Council Bluffs, Waterloo, and Des Moines. Designed using current curriculum standards, these supplemental lessons were incorporated into a variety of subjects during the intervention period.

The two school-based nutrition education programs also used indirect education methods (e.g., take-home materials and activities for parents and children to do together) to reinforce their programs' messages with the children and parents.

a. Direct education

A summary and comparison of program reach and exposure for the primary and secondary target audiences of each of the three demonstration projects is provided in Table IV-3. It is important to note that, given the variations in program design and levels of exposure, direct comparisons of these indicators across the three demonstration projects should be interpreted with caution. The type of information provided by the IA for this purpose was not consistent. Moreover, these indicators are not always precise measurements but rather averages based on assumed exposure levels and do not take into account the nature or intensity of the exposure participants had to the respective programs.

The BASICS intervention had the greatest reach among children, its primary target audience. BASICS Plus reached a total of 631 children in 11 schools in Des Moines, and 613 children in Council Bluffs and Waterloo were reached by the BASICS intervention in 11 schools. Children in the BASICS schools participated in eight direct education lessons, each lasting an average of 31 minutes, while children in the BASICS Plus schools participated for an average of 30 minutes per direct education lesson. Thus, the total potential dosage of nutrition education provided directly to participating children was 248 minutes for BASICS and 240 minutes for BASICS Plus over the eight-week program. Extended lessons provided by classroom teachers in both BASICS Plus and BASICS interventions ranged from 0 to 120 minutes, with a mean of 50 minutes. Analysis of intervention data show that, on average, children received a total of 376 minutes of nutrition education through extended activities in the BASICS intervention and 351 minutes of nutrition education through extended activities in the BASICS Plus intervention. Analysis of combined exposure to direct educator and classroom teacher implemented BASICS Plus and BASICS activities show that, on average, children received 621 minutes of nutrition education through the BASICS intervention and 591 minutes through the BASICS Plus intervention.

The LEAP2 program reached 889 children in 42 classrooms in the eight schools that participated in the demonstration project and that were evaluated as part of this study. Eight weekly LEAP2 lessons were facilitated by the direct educators. On average, most classes were 30 minutes long, for a total potential exposure for each child to the intervention of 240 minutes. Individual dosage was calculated for only the first four weeks of the program due to problems encountered with school holidays and weather closures. Dosage data was collected for 765 of the participating students for the first four weeks. Analysis of the UKCES program dosage data shows that 99 percent of children (n = 754) attended at least the first four of eight total intervention lessons.

The ESLS program reached 326 seniors at 18 different senior centers. Analysis of the ESLS program data show that on average, seniors received a total of 259 minutes (4.3 hours) of nutrition and physical activity education through ESLS, with four individual lessons ranging from 61 to 68 minutes.

Exhibit IV-3. Key Indicators of Program Reach and Dosage, by Demonstration Project

Project	Reach Number of Primary Target Audience Members Reached in the Evaluation Sample	Number of Lessons Attended or Accessed by Primary Target Audience (Range)	Average Lesson Duration (Minutes)	Dosage Average Duration of Total Exposure per Participant (Minutes)
BASICS PROGRAM				
BASICS[a]	613	1–8	31	248
BASICS Plus[a]	631	1–8	30	240
LEAP2	889	1–8	30	240
ESLS	326	1–4	65	259

[a] Classroom teachers who extended the BASICS and BASICS Plus curriculum in Des Moines, Council Bluffs, and Waterloo provided an average of 52 minutes per month in 55 classrooms during the intervention period. The teachers did not teach distinct "lessons," but rather used materials and themes from the BASICS curriculum.

Source: Demonstration project administrative data.

b. Indirect education

For the two child-focused demonstration projects, indirect education was provided primarily in the form of take-home materials, such as newsletters, fact sheets, quizzes, and healthy recipe ideas, that were intended to promote child and parent or caregiver interaction and reinforce key nutrition education messages. When surveyed about their use of indirect education, parents and caregivers reported varied exposure. When parents and caregivers of the students in the LEAP2 program were asked whether they read the LEAP2 newsletters that were distributed to their child after each lesson, the majority of parents (66 percent) reported reading only one to four of the eight newsletters.

The BASICS intervention provided indirect education through take-home materials, including activities and a family newsletter. When parents and caregivers were asked about whether they read the monthly family newsletters, 33 percent read all seven newsletters and 47 percent read some. Approximately 15 percent stated that they did not receive the newsletter.

"Be a Milk Superstar!!" was another take home-home activity, which approximately 32 percent of both the BASICS and BASICS Plus respondents stated that they completed with their child, while 51 percent said that they did not receive this take-home activity. The set of eight bingo cards was the most popular take-home activity, with a mean of 4.4 out of 8 cards played or used by parents and caregivers and their children. The goal of the bingo activity was to encourage children to eat the fruits or vegetables pictured as they completed the activities pictured on the card to get "bingo."

The BASICS Plus intervention offered the additional element of the social marketing campaign that included activities and indirect education provided in the community environment. Parents and caregivers were surveyed about their awareness of three social marketing nutrition education campaign messages: Pick a **better** snack™ (PABS), Bodies Change, and Be Strong. PABS messages may have been seen in BASICS curriculum materials. The Bodies Change messages were confined to the city of Des Moines via the social marketing campaign. Be Strong messages are used in INN's Power Panther stickers and posters to promote consumption of milk and other dairy products.

In both groups, more than 80 percent of parents and caregivers were aware of the PABS campaign, a campaign that has been seen in Iowa since 1998, hence a greater awareness. A much smaller percentage of parents and caregivers were aware of the Bodies Change campaign, a newer message promoting consumption of low-fat and fat-free milk, than PABS. Twenty percent of BASICS and 30 percent of BASICS Plus parents and caregivers were aware of this campaign. However, the high response rate from BASICS parents is unusual, since the Bodies Change campaign was only promoted in Des Moines. Unless parents frequently traveled to shop at retail stores in Des Moines, the BASICS parents in Council Bluffs and Waterloo would not have been exposed to this campaign. Forty-nine percent of BASICS and 36 percent of BASICS Plus parents and caregivers were aware of Be Strong messaging. Power Panther stickers and posters with accompanying Be Strong messaging were not part of the BASICS program intervention, but they are generally used in elementary schools, which may explain the high level of awareness.

5. Costs of Program Design and Implementation

a. Costs of program development

Only two of the three IAs, INN and UKCES, provided information on the costs required to design and develop their model of nutrition education because these programs were originally designed by the IAs. MSUE implemented the FNS-designed ESLS program and thus did not have design costs. Overall, the design and development of the INN and UKCES demonstration projects cost nearly $313,000 and a little more than $19,000, respectively. The social marketing campaign developed and implemented by INN for the BASICS Plus intervention accounts for the substantial difference between the two projects' development costs.

The total cost of program implementation varied greatly (see Table IV-4), with the contribution of salaries being the most diverse. Total implementation costs for the LEAP2 demonstration project was the lowest cost of the three demonstration projects, requiring few materials other than the storybooks and foods for the tasting activity.

Another way to compare implementation costs among demonstration projects is to examine their per-participant implementation costs. This comparison, however, presented some challenges. Depending on the type of intervention, costs per program participant can be calculated based on the number of children or adults who receive a single intervention dose, complete the entire intervention, or are enrolled in a "site" where interventions are being conducted. To ensure common definitions of participants in the two child-focused demonstration projects, the number of children reached—defined as having participated in at least one nutrition education lesson—served as the denominator for cost-per-participant calculation. For the ESLS demonstration project, the denominator was the number of seniors who participated in at least one lesson. The total cost of program implementation, as reported by the demonstration projects, served as the numerator for this calculation. These values and each program's estimated cost per participant, which ranged from approximately $31 for LEAP2 program to $179 for BASICS Plus, are presented in Table IV-4.

Exhibit IV-4. Total and Per-Participant Cost of Program Implementation, by Demonstration Project

Measure	INN (BASICS PROGRAM) BASICS	INN (BASICS PROGRAM) BASICS Plus	UKCES LEAP2	MSUE ESLS
Number of children or senior participants	613 children	631 children and 3,054 family members [a]	889 children	326 seniors [b]
Total cost of implementation[d]	$68,092.00	$276,179 [c]	$27,521.01	$43,419.00
Cost per participant	**$111.08**	**$120.52 to $178.56**	**$30.96**	**$133.19**

[a] The number of family members reached by the BASICS Plus program for the purpose of calculating the per-participant cost of the social marketing campaign is based on a household size of 4.84 (baseline survey data) . The calculation is thus 631 BASICS Plus child participants x household size of 4.84, providing an estimated total reach of 3,054 = $67.48 per participant for social marketing and the estimated total cost per participant is $111.08+$ 67.48= $ 178.56.

[b] Total number of seniors potentially reached through direct education.

[c] The total includes cost of direct education plus the social marketing cost ($ 206,087.82). If the social marketing cost per child were based on the number of SNAP-eligible children who participated in the BASICS curriculum in Des Moines schools (not just the BASICS Plus schools in the independent evaluation), the total child reach is estimated at 4,507. The number of family members reached by the BASICS Plus program for the purpose of calculating the per-participant cost of the social marketing campaign is based on a household size of 4.84. The calculation is thus 4,507 child participants x household size of 4.84, providing an estimated total reach of 21,813. The estimated cost per child participant and their family members for the social marketing component in this scenario is $9.44 and the total estimated cost is $111.08+$ 9.44=$120.52.

[d] Includes planning and design costs for INN and UKCES. Having implemented a program developed by USDA, MSUE did not incur planning and design costs.

Source: Demonstration project administrative data.

B. Assessment of Common Implementation Successes, Challenges, and Lessons Learned Across the Two Child-Focused Demonstration Projects

The process evaluation revealed some common and encouraging successes in the implementation of the child-focused demonstration projects. At the same time, the process evaluation identified a number of implementation challenges that might have had an impact on the outcome measures of interest. This section summarizes the implementation successes and challenges that were common across the child-focused projects and concludes with lessons learned. These lessons represent opportunities for program refinement and provide important considerations for future implementation of these specific programs as well as other SNAP-Ed programs seeking to improve children's dietary behaviors.

1. Successes

Findings from the process evaluation indicate that the child-focused demonstration projects were well designed and supported by school personnel. Moreover, several specific indicators of the programs' success were identified through the process evaluation:

- The program design, content, and messages were very well-received by school principals and teachers at the intervention sites.

- Most school principals and teachers helped support program implementation and reinforced nutrition messages with children.
- Direct educators were effective, felt well-prepared to teach the curricula, and found it easy to implement.
- Parents and caregivers were very satisfied with the program.

A more detailed description of the process evaluation findings for the child-focused programs follows:

▲ **The program design, content, and messages were very well-received by school staff at the intervention sites.**

School principals and teachers at participating sites routinely praised each program's design, messages, and materials. In one-on-one interviews, principals and teachers frequently noted that they enjoyed the programs' focus on nutrition and physical activity, appreciated the use of multiple methods for delivering nutrition messages, and respected the high quality of the educational materials and the direct education staff. School principals and teachers across these programs said that the lessons and methods reflected an in-depth knowledge not only of the target population's needs but of how young children learn. In particular, principals and directors appreciated the interactive, child-focused nature of the lessons, as well as the use of parent education as a way to encourage change in children's behavior. School staff also appreciated the flexibility of SNAP-Ed program staff in accommodating class needs, staff schedules, and unexpected events.

Directors at the sites implementing BASICS interventions and LEAP2 said that they particularly liked how the curricula successfully encouraged children to become actively involved in learning through movement and music, discussion questions, food tastings, and other hands-on activities.

In post-implementation interviews, when directors and school principals were asked whether they would like the program to come back to their sites, all respondents indicated that they would welcome the program again at their sites if the opportunity was offered.

▲ **Most school principals and teachers helped support program implementation and reinforced nutrition messages with children.**

Based on key-informant interviews, most principals and teachers were helpful throughout program implementation. Program managers and direct educators suggested that the presence of an administrator who was engaged in the program was a major facilitator of implementation. Some principals interviewed had designated one person to be primarily responsible for program coordination in the school and felt that this helped the program run smoothly and improved communication during the LEAP2 program. For this program, educators worked closely with the school family-resource coordinators. These staff members were designated by the schools to be a resource for family programming and support. The county extension agents and direct educators used these coordinators, with varying levels of reported success, for communication and scheduling. The direct educators reported that the level of engagement of each individual family-resource coordinator was directly related to the success of program implementation at that school.

Key-informant interviews and direct observations of the two school-based programs also revealed broad teacher support for these programs. Although teachers involved in the LEAP2 program had difficulty implementing the daily fruit and vegetable recall activity, they reported a high degree of

satisfaction with the LEAP2 messages. Of the LEAP2 teachers surveyed, 74 percent reported incorporating some of the LEAP2 nutrition messages in their classrooms.

In the case of the BASICS intervention, supplemental materials were provided to teachers in an effort to increase their buy-in and encourage their reinforcement of the program's messages in the classroom. The supplemental materials were equivalent to four additional lessons, for a total equivalent of 12 BASICS lessons delivered to children participating in the BASICS intervention. Nearly all of the teachers who participated in the BASICS intervention sites reported delivering nutrition messages to the children in their classrooms during the time of the intervention.

- **Direct educators were effective, felt well-prepared to teach the curricula, and found the curricula easy to implement.**

An important facilitator noted by all stakeholders was the effectiveness of the direct educators. Principals and teachers commented on the professionalism and dedication of the direct educators. The most often-cited reasons for the effectiveness of the direct educators were their ability to engage the students and their level of preparation. For example, teachers in both programs praised the direct educators for the way in which they introduced the food-tasting component to the students and established rules about negative comments.

The ease with which direct educators could implement the curriculum was fundamental to their successful implementation. Direct educators' confidence in their ability to teach the curriculum was critical in terms of winning the support of school principals, as well as ensuring program fidelity across the intervention sites. The educators uniformly reported that the lesson plans were both enjoyable and easy to carry out regardless of the classroom size and environment. Many of the direct educators who had not been directly involved in the design of these SNAP-Ed programs attributed their comfort and ease in implementing the classes to the clarity of the written lesson plans and the classroom resources.

- **Parents and caregivers were very satisfied with the program.**

Parents of participating children expressed satisfaction with what they and their children were learning. For both child-focused programs, the majority of parent survey respondents were very satisfied with the programs' take-home materials. In focus group sessions, parents and caregivers described how important the programs were in supporting their efforts to help their children be healthy. In particular, they praised the content and relevance of the nutrition messages and the quality and usefulness of take-home materials and activities. For both programs, parents reportedly liked the materials, recipes, and food preparation suggestions they received. Focus group participants particularly mentioned satisfaction with the BASICS materials and newsletter and the LEAP2 program's newsletter and food-tasting component.

Although completion rates of take-home materials was less than ideal from the program planners' perspective, the majority of parent survey respondents who reported completing the take-home materials said they were useful in helping their child to eat healthier foods. Direct observations by the independent evaluator of the BASICS Plus Family Night Out events also found that most adult participants were actively engaged and interested in the discussions and activities related to the health and physical activity of their children.

2. Challenges

Despite the many aspects of program implementation that were successful, the process evaluation also identified several challenges and barriers that may have impeded the ability of these two child-focused

programs to be fully successful. The implementation challenges common to the child-focused demonstration projects are as follows:

- Maximizing parent and caregiver reach and engagement,
- Maximizing school staff engagement in supporting program implementation,
- Parent and caregiver concerns about costs of purchasing fruits and vegetables and trying new recipes,
- Providing face-to-face interactive training for direct educators, and
- Implementation timeframe imposed by the independent evaluation.

This section describes the implementation challenges evaluations at greater length.

▲ **Maximizing parent and caregiver reach and engagement.**

Many key informants identified reaching and engaging parents and caregivers as the greatest challenge to effectively implementing SNAP-Ed programs targeted to children. Parents in both the BASICS and LEAP2 programs, where parents were reached with an indirect education component, reported that they would have been better prepared to support their children's behavior change if they had known more about the program goals and content. Some parents also reported that they may have read more newsletters and other materials if they had more information about the program at the beginning. Across the two projects, parents and caregivers most commonly cited limited time, schedule conflicts, and difficulty relying on children to bring home materials as reasons for not participating in sessions or using take-home nutrition education materials and activities.

▲ **Maximizing school staff engagement in supporting program implementation.**

As noted above, the level of engagement with these programs was generally high among school principals and classroom teachers. However, there were several teachers who reportedly were not very engaged and did not provide needed help in program implementation. In the classrooms where the teachers were not actively engaged, key informants reported that implementation was challenging. They pointed out that less engaged teachers did not provide the support that the BASICS and LEAP2 direct educators needed to facilitate scheduling, reinforce lessons, and integrate nutrition concepts into the classroom.

Challenging to the BASICS interventions was effective integration of the four supplemental lessons into the curriculum. Some classroom teachers skillfully integrated the BASICS lessons into math, science, and other courses, but others were not as effective at the integration of nutrition education into the existing curriculum. Lack of educational preparation, interest in the subject matter, and overall engagement in the program were cited as barriers to successful integration of the supplemental lessons.

The greatest challenge to LEAP2 implementation cited by both teachers and NEP assistants was completing the daily fruit and vegetable recall calendar. Although some teachers indicated that the fruit and vegetable calendar helped the children think about what they were eating, only 29 percent of teachers reported being able to complete the fruit and vegetable calendars with the children each day. Time and inability of children in primary school to complete the food recall were cited by teachers as the two greatest barriers for completing the calendars.

- **Parent and caregiver concerns about costs of purchasing fruits and vegetables and trying new recipes.**

  Focus group participants from both child-focused programs cited the high cost of fresh fruits and vegetables as a barrier to making some of the recommended dietary changes. These parents also said that they were reluctant to try some of the recipes because they could not afford to waste the leftovers if their child would not try the new foods. Though not specified in the nutrition messages of the child-focused demonstration projects, several parents of children in the BASICS intervention clearly perceived that they were being encouraged to feed their children only fresh fruits or vegetables, instead of canned, frozen, or dried forms. Focus group participants expressed concern about the expense of maintaining an adequate supply of fresh produce with limited shelf life. In some cases, parents reported that, though they wanted to buy more fruits and vegetables, they could not afford the time and expense required traveling to several stores to find affordable, high-quality produce.

- **Providing face-to-face interactive training for direct educators.**

  Program administrators for both child-focused programs noted the importance of providing direct educators with sufficient training, allowing them to facilitate the intervention with confidence and skill. Two common aspects of effective training cited by program administrators and educators were having face-to-face training and having an interactive component for educators to practice with the material prior to facilitating it in the classroom. Direct educators in the LEAP2 program reported that the training and preparation offered by the state extension staff was not as extensive as they would have liked.

- **Implementation timeframe imposed by the independent evaluation.**

  Due to the time needed to secure Office of Management and Budget approval and the requirements for the successful completion of the independent evaluation's data collection and analysis, program planners reported having to make adjustments in their intervention scheduling.

  INN program administrators reported planning to begin the BASICS intervention in October, but were delayed by one month in order to allow the independent evaluation data collection to take place. This required INN to begin the BASICS intervention in November and teach lessons 1 and 2 in that month so they could stay on schedule for the school year. This demanded that the direct educators schedule twice as many lessons in one month than they typically would.

  Similarly, UKCES program administrators reported planning for the intervention to start in early fall but having to shift the schedule to start in November to complete the necessary independent evaluation data collection. All stakeholders discussed the challenge of providing school programming in Kentucky during the winter months. Historically harsh winters and difficult travel conditions in rural Kentucky have led to frequent school closings. Program administrators felt that the breaks in the curriculum due to the winter holidays may have reduced the effectiveness of the implementation and negatively affected the completion of the fruit and vegetable calendars. The recommendation of several stakeholders was to conduct LEAP2 early in the school year to avoid potential winter weather, holiday breaks, and school testing that occurs in the spring.

3. Lessons Learned

This section identifies a number of lessons learned from studying the implementation of the child-focused demonstration projects. These lessons address what worked well in program design and implementation as

well as opportunities for improved program implementation in these and other SNAP-Ed programs that target early elementary school-age children.

- **It is important to establish strong working relationships with intervention staff.**

  Program staff emphasized the importance of establishing strong working relationships with school administrators and classroom teachers at the intervention sites. They remarked that the time and effort spent on visiting and communicating directly with the school principals and teachers helped to secure their onsite support in program implementation, including assistance in recruiting parents, caregivers, and teachers to participate in the program. Principals interviewed for both the LEAP2 and BASICS interventions described a positive relationship with the IAs that had facilitated other well-received curricula in the schools. These principals reported that early meetings about the LEAP2 program were important to introduce the program and establish buy-in among the principals. School principals reported that flexibility in scheduling was instrumental in gaining their cooperation and satisfaction with the program.

- **A focus on training and monitoring is key to promoting program fidelity and quality.**

  The program managers and direct educators in the LEAP2 and BASICS interventions noted that the trainings, onsite reviews, lesson logs, and team meetings each played a critical role in helping educators learn how to use the curriculum and improve the quality of their teaching skills. The team meetings were seen as practical formats for the educators to address challenges in program implementation. The lesson logs completed by the direct educators and onsite reviews by program supervisors were recognized by program managers as a positive and supportive way not only to track program fidelity but, more importantly, as a way for direct educators to improve their teaching methods and for supervisors to identify common needs to inform future trainings. Program managers and direct educators for both programs stressed the need for interactive training that would allow educators to learn new skills and practice teaching in front of their peers to gain proficiency and confidence.

- **Using multiple methods of nutrition education delivery may be most effective in maximizing parent and caregiver reach and engagement.**

  SNAP-Ed programs that target elementary school-age children and their families need to continue to find ways to make their information and materials more accessible to low-income families. Key informants offered several ways to improve the reach of such programs. For example, to increase attendance at parent and family events, they suggested increased communication directly from the school about these events, encouraging parents to attend. They also recommended that such events be held at different times of the day and week to accommodate parents' varied work hours and scheduling needs. Other suggestions for ways SNAP-Ed programming can reach the parents and children of elementary school-age children include the following:

  - Adding educational channels to reach parents, such as information dissemination via the Web (a school or program Web site) or direct e-mails;
  - Implementing a social marketing campaign, based on formative research about the target audience, to reach children and families enrolled at the targeted schools;
  - Implementing cooking classes or other classes aimed specifically at parental behavior; and
  - Providing an opportunity for caregivers to share recipe ideas with one another (e.g., via a blog or shared Web site).

- **Greater support and increased communication from SNAP-Ed programs help facilitate greater involvement and support from intervention site staff, including ongoing program reinforcement by teachers.**

  As highlighted in the discussion of implementation challenges above, a sustained effort is necessary to maximize staff engagement in SNAP-Ed programs that are conducted in schools. Recognizing that principals and teachers are very busy, securing their help in program implementation will require sensitivity to the multiple demands on their time. Programs should consider providing clear, written expectations to principals and classroom teachers as part of the site recruitment process. For example, these expectations might include providing logistical support in scheduling the lessons, raising program awareness among parents, and recruiting for the parent classes and events.

  Expectations for teacher engagement during the SNAP-Ed classroom lessons should be clearly communicated to principals and consideration should be given to including an educational component targeted to classroom teachers. Additionally, teachers could be given sample scripts and other materials to reinforce SNAP-Ed program messages with the children in their classrooms.

- **It is important to communicate solutions for addressing low-income families' food cost concerns.**

  SNAP-Ed programming targets families who have limited budgets to meet their basic needs. To maximize a SNAP-Ed program's impact on children's fruit and vegetable consumption at home, the program must address parent and caregiver concerns about the costs of fruits and vegetables relative to their available budget—whether these are real or perceived barriers to healthy eating behaviors for their children. For example, the curriculum could be supplemented with more informational materials on meal planning and shopping on a limited budget and include more recipes using fruits and vegetables. In addition to fresh, parents and caregivers should be encouraged to prepare all forms of fruits and vegetables, including frozen, canned, and dried. Additionally, SNAP-Ed programs should provide eligible nonparticipants information on how they can access the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC), SNAP, and emergency food assistance.

C. Assessment of Implementation Successes, Challenges, and Lessons Learned in the ESLS Demonstration Project

The process evaluation demonstrated many program successes in the MSUE implementation of ESLS. At the same time, the process evaluation identified a number of challenges in implementing this project that might have had an impact on participants' consumption of fruits and vegetables. This section summarizes the implementation successes and challenges and concludes with lessons learned. These lessons represent opportunities for program refinement and provide important considerations for future implementation of these specific programs as well as other SNAP-Ed programs seeking to increase consumption of fruits and vegetables among seniors.

1. Successes

During the process evaluation, several specific indicators of program success were identified. Moreover, these indicators were attributed to the overall success of the program.

- Direct educators found ESLS to be relevant, well-designed, and easy to implement.
- Participants reported a high degree of satisfaction with the program and program materials.

- The mode of nutrition education delivery was well-received by key stakeholders.
- Direct educators were well-received by senior centers and participants.
- Participants engaged in the take-home activities.

This section describes the successes found in implementation of the ESLS program at greater length.

▲ **Direct educators found ESLS to be relevant, well-designed, and easy to implement.**

MSUE direct educators reported that ESLS included consistent and simple messaging, age-appropriate content, and modifiable physical activities. Direct educators also reported that the review of material each week with a consistent and simple message was helpful for ESLS participants. In addition, the focus on eating more fruits and vegetables was valuable for seniors, and the lesson format encouraged communication, ideas, and discussion among participants.

Ninety-two percent of educators believed the curriculum was appropriately designed for seniors who attended the lessons. The majority believed the participants were all very engaged. Senior participant engagement in the intervention was corroborated by the survey of ESLS participants.

▲ **Participants reported a high degree of satisfaction with the program and program materials.**

Observations conducted at selected senior centers implementing ESLS clearly demonstrated seniors were engaged in the program by questions that they asked and input that they provided. Focus group interviews with ESLS participants revealed that seniors enjoyed participating in the nutrition education and physical activity components of the program and that they were looking forward to another program of this nature if it were offered at their center.

▲ **The mode of nutrition education delivery was well-received by key stakeholders.**

Interviews with center directors and center administrators provided a great deal of insight into how ESLS was received. The directors enjoyed having this programming available for their participants because it helped provide a well-rounded grouping of programs for their seniors. The center directors also mentioned the limited time commitment (a one-hour session in a series no longer than six weeks) works well for their participants. More than one senior center director mentioned that the content of the ESLS program and the methods used in teaching it were appropriate for seniors.

▲ **Direct educators were well-received by senior centers and participants.**

Focus group participants reported a high degree of respect for MSUE educational programming. Seniors noted the combination of programming from MSUE and the professional educators employed by cooperative extension provided a level of respect for programs that they offer to the community.

▲ **Participants engaged in the take-home activities.**

ESLS lesson materials included handouts for participants to complete in class, take-home reference materials, and a "Set Your Goals" activity sheet to complete and bring back to the next class. The activity sheets asked participants to set physical activity and fruit and vegetable consumption goals for the next week.

A majority of participants either agreed or strongly agreed that filling out the activity sheets influenced them to eat more fruits and vegetables. Moreover, 63 percent completed all four activity sheets, while 21 percent completed three.

2. Challenges

Despite the many aspects of the ESLS program implementation that were successful, the process evaluation also identified several challenges and barriers that may have impeded the ability of this adult-focused program to be fully successful. The implementation challenges experienced by the demonstration project include:

- Recruitment of senior centers for participation in the ESLS program.
- Recruitment of age-eligible seniors into the ESLS program.
- Maximizing participant engagement in the take-home activities.
- Cost of fresh fruits and vegetables.

This section describes challenges identified in implementing the ESLS program at greater length.

▲ **Recruitment of senior centers for participation in the ESLS program.**

Recruitment of senior centers in educational programming can be challenging. During implementation of the ESLS program, it was necessary to extend the timeline for recruitment of centers. The evaluation manager reported that it was difficult to recruit enough senior centers for the study primarily because study commitments from senior centers had been obtained early on, long before the study started. During that interim period, changes in personnel at senior centers and MSUE required obtaining new commitments from senior centers at the commencement of the study.

▲ **Recruitment of age-eligible seniors into the ESLS program.**

ESLS is designed for able-bodied, independent adults 60 to 74 years of age (USDA, 2007a). This age range is difficult to achieve at senior centers, where many participants are older than 74 and do not want to be excluded from programming.

The MSUE demonstration project recruitment materials targeted seniors ages 60 to 74, but younger and older seniors also signed up for the program. During the course of the study, when MSUE was experiencing difficulties recruiting the target age range, FNS allowed an age range of 60 to 80 years to be enrolled in ESLS for the purpose of the study. Of the ESLS participants included in the independent evaluation, 12 percent were younger than 60 or older than 80. This represents a significant number of seniors who were not targeted for the ESLS program yet participated.

Educators are encouraged to consider cognitive abilities, vision, hearing, and mobility limitations when planning lessons for groups of seniors. The ESLS Leader's Guide emphasizes that ESLS was developed and tested for low-income adults 60–74 years of age, but even in this age range, seniors' needs and capabilities vary greatly.

▲ **Maximizing participant engagement in the take-home activities.**

ESLS lesson materials include handouts for participants to complete in class, take-home reference materials, and a "Set Your Goals" activity sheet to complete and bring back to the next class. The activity sheets asked participants to set physical activity and fruit and vegetable consumption goals for the next week. A majority of participants either agreed or strongly agreed that filling out the activity sheets influenced them to eat more fruits and vegetables. Moreover, 63 percent completed all four activity sheets, while 21 percent completed three.

- **Cost of fresh fruits and vegetables.**

  Although the materials include references and activities that clearly point out the use of canned, frozen, and dried fruits and vegetables in addition to fresh, seniors felt that in general, the cost of fruit and vegetables can be a barrier to consuming more. In focus group discussions, some seniors stated that while they very much liked the goals of the program, the cost of fresh fruits and vegetables on a very limited budget was a major barrier to increasing the amount of fruits and vegetables in their diet.

  Seniors also stated that it can be difficult to make trips to the grocery store for fresh fruits and vegetables on a regular basis if they do not have transportation. The ESLS program information, however, does provide some suggestions for getting transportation to the grocery store (e.g., asking a friend for a ride, using public transportation).

3. Lessons Learned

This section identifies a number of lessons learned from studying the implementation of ESLS by MSUE. These lessons address what worked well in implementation as well as opportunities for improved program implementation in these and other SNAP-Ed programs that target seniors.

- **It is important to establish strong partnerships with senior center and senior housing administrators and managers.**

  The evaluation manager reported that it was difficult to recruit enough intervention and comparison centers for the study. The primary reason for this challenge was that study commitments from senior centers had been obtained early on, long before the study started. During that interim period, changes in personnel at senior centers and MSUE required obtaining new commitments from senior centers at the commencement of the study.

- **Recruitment of seniors for ESLS should be closely aligned with recommended age range.**

  It was difficult to recruit the required number of senior centers for the evaluation for a number of reasons, the most important of which was the recommended age range. The senior centers' role was central to the recruitment of ESLS participants who were in the recommended age range; without their assistance, direct educators would have found recruitment challenging. As direct educators reported, the senior centers are central to a successful program implementation.

- **High-quality training provides for effective and consistent data collection.**

  The program director commented on the high quality and effectiveness of the data collector training. Based on her observation and review of the training program, as well as data collectors' administration of the pre- and post-surveys, she thought that the training that they received helped to ensure that the data were collected consistently and appropriately. She specifically cited the emphasis placed on administering the surveys in a manner that would reduce response bias to the greatest extent possible (e.g., paying close attention to intonation while reading survey questions).

- **The ESLS curriculum design facilitated an efficient and effective intervention for educators.**

  The ESLS curriculum is a four-lesson curriculum implemented primarily at senior centers. The design of ESLS provides for a simple and efficient intervention, and seniors reported this program to be interesting and the right length for their interests. The take-home materials included in the curriculum were also reported to be easy to complete and the right length.

D. Implementation Factors That May Have Affected Impact Results

In addition to assessing key facilitators and challenges of the demonstration projects, it is important to consider program implementation factors that may have affected the intervention's impact results or outcomes.

- **Program dosage.**

  Program dosage is an important factor to consider in assessing demonstration project outcomes because it indicates the amount and intensity of participant exposure to nutrition messages. The BASICS intervention had the greatest dosage and exposure of the three demonstration projects, as combined average exposure to all lessons (direct educator and classroom teacher implemented) was 621 minutes for BASICS and 591 minutes for BASICS Plus, compared with 259 minutes for ESLS (six lessons) and 240 minutes for LEAP2 (eight lessons). An estimated 77 percent of participating seniors received the full dose of the ESLS intervention; the number of participants receiving the full dose of the BASICS or BASICS Plus and LEAP2 interventions was not collected. The LEAP2 administrators implemented a system for assessing lesson dosage that reportedly worked well for the first four to five weeks of the intervention. Problems encountered in the remaining weeks were attributed to the winter holidays. In total, fruit and vegetable calendars with attendance records were collected for 765 participating students. Analysis of the UKCES program dosage data shows that 99 percent of children (n = 754) attended at least the first four of eight total intervention lessons.

  In considering program dosage, continuity in implementation, often dictated by the intervention timeline and changes to the timeline, is another factor that affects the intensity of the intervention dosage received and, potentially, program outcomes. Students in the LEAP2 intervention classrooms received the program lessons across a varied implementation timeline due to scheduling delays and changes associated with conflicting school events, holidays, and weather-related school closings. Program maturity.

  Program maturity is an important factor to consider when looking at whether a program was successfully implemented and had an impact on the target audiences' behaviors. While each of the demonstration projects was at a different point in maturity when they participated in this study, all three projects implemented either a previously piloted curriculum (INN, UKCES) or an already established curriculum (ESLS). The BASICS curriculum was reviewed and modified by direct educators a few months prior to implementation, and the LEAP2 curriculum was originally developed in 2004 but then modified for the demonstration. While MSUE was using an already developed and implemented FNS curriculum, they were incorporating ESLS for the first time into their programming for seniors. All three demonstration projects also had good, pre-established relationships with their partners in implementation (schools and senior centers).

- **Modifications to the intervention from the proposed approach.**

  While modifications to an intervention throughout its implementation are likely and expected, some modifications from the plan may adversely affect program outcomes. For UKCES, the use of the fruit and vegetable calendars to track children's daily intake was only planned for the intervention schools; however, due to an oversight in communication, the calendar was used in both the intervention and control schools. Since completing the calendar could influence children's consumption, use of this calendar with the control group likely diminished some of the distinguishable impacts of LEAP2 on the intervention group. MSUE experienced initial challenges with participation in the program and

recruitment of their original target audience of seniors aged 60 to 74. As a result, they had to expand their recruitment to seniors up to age 80, while adjusting their recruitment strategies to encourage more eligible seniors to participate.

Chapter V • Integrated Impact Evaluation Findings

The independent evaluator conducted an impact evaluation for each demonstration project using the approach described in Chapter III. This chapter summarizes the findings for the primary and secondary impacts and compares and contrasts the impact evaluation findings for the three demonstration projects. Because of the different target audiences and the differences in the secondary outcome measures for the two child-focused programs and the ESLS program for seniors, the results for ESLS are presented and discussed separately.

Key Findings

Primary Impacts

- The BASICS and BASICS Plus interventions for children and the ESLS program for seniors significantly increased combined fruit and vegetable consumption.
- The BASICS Plus intervention had a statistically significant impact on children's at-home use of 1 percent or skim milk.

Secondary Impacts

- Compared with the control group, the BASICS Plus intervention had a statistically significant impact on the number of days on which children ate more than one kind of vegetable, while the BASICS intervention significantly increased the number of days on which children ate more than one kind of fruit.
- The BASICS and BASICS Plus programs had a statistically significant impact on children's increased willingness to try new kinds of fruit.
- The LEAP2 program had a statistically significant impact on household availability of fruits and vegetables.

A. Overview of Evaluation Findings From the Evaluation Framework Perspective

As described in Chapter III, the impact evaluation was guided by a conceptual framework that helped track the range of potential program effects. The framework specified two types of secondary outcomes: (1) mediating factors that represent attitudes, beliefs, and actions that would be expected to change to facilitate the desired changes in short- and long-term dietary outcomes, such as willingness to try new fruits and vegetables, and (2) short-term outcomes that include behavioral antecedents, such as eating a variety of fruits and vegetables each day. The long-term outcomes, or primary program impacts, reflect the ultimate goals of the program—changes in dietary intake that improve nutrition.

Exhibit V-1 summarizes the impact evaluation findings. The table columns represent the program effects (mediating factors, short-term outcomes, primary impacts) from the evaluation framework. The BASICS Plus, BASICS, and ESLS programs had a statistically significant impact on their primary outcomes; the LEAP2 program did not affect the primary outcomes of interest. Likewise, statistically significant impacts on short-term outcomes were observed for the BASICs Plus, BASICS, and ESLS programs but not for LEAP2. Statistically significant impacts on mediating factors were observed for BASICs Plus, BASICS, and LEAP2 but not ESLS.

Exhibit V-1. Statistically Significant Impacts for the Three Demonstration Projects

Program	Secondary Impacts		Primary Impacts
	Mediating Factors	Short-Term Outcomes	Long-Term Outcomes
BASICS	●	●	●
BASICS PLUS	●	●	●
LEAP2	●	○	○
ESLS	○	●	●

● Statistical significance at $p \leq 0.05$.

○ Not statistically significant, $p > 0.10$.

B. Summary of Impacts for the Child-Focused Demonstration Projects

1. Findings Related to Primary Impacts

Primary impacts common to the two child-focused programs—BASICS and LEAP2—included measures of daily at-home consumption of fruits and vegetables. It was hypothesized that children participating in these programs would increase their average daily at-home consumption of fruits and vegetables by an average of 0.30 cups, compared with children not participating in the programs. The evaluation of the BASICS interventions also assessed program impact on the child's at-home use of 1 percent or fat-free milk.

Table V-1 presents the results of the primary impact models. Before examining the impacts of the programs, it is worth noting that some of the observed differences in baseline fruit and vegetable consumption in the BASICS and BASICS Plus interventions may be due to the quasi-experimental nature of the design and pre-existing differences among the individuals living in each of the communities for the two intervention groups and the comparison group. These differences are not apparent in the evaluation of the LEAP2 program, where random assignment of schools to a study condition was possible.

Compared with the comparison group, the BASICS Plus and the BASICS interventions had a significant impact on parental reports of children's consumption of fruits and vegetables combined and fruit individually. The BASICS Plus intervention had a significant impact on vegetable consumption whereas the BASICS intervention did not. When the results of the two interventions—BASICS and BASICS Plus—were compared, there was no statistically significant impact on fruit and vegetable consumption individually or combined. The LEAP2 program did not demonstrate a statistically significant impact on parental reports of children's daily consumption of fruits and vegetables individually or combined.

The BASICS Plus intervention produced a statistically significant impact on parental reports of children's at-home use of 1 percent or fat-free milk. Children in the BASICS Plus intervention group were about 32 percent more likely (odds ratio = 1.32) than children in the comparison group, and 34 percent more likely (odds ratio = 1.34) than children in the BASICS intervention group, to drink or use 1 percent or fat-free milk on their cereal instead of 2 percent or whole milk. The BASICS intervention did not have an impact on at-home use of 1 percent or fat-free milk.

These results suggest that the BASICS program achieved statistically significant program effects for several primary outcomes, compared with the comparison group. The addition of the social marketing

component of the BASICS Plus intervention provides additional measureable effects, most notably related to vegetable consumption and the use of 1 percent or fat-free milk.

Table V-1. Primary Impacts for Child-Focused Programs

Measure (at-home consumption)	Model-Adjusted Baseline Means (SE)		Model-Adjusted Follow-Up Means (SE)		Estimated Impact[a] (95% CI)
	Intervention Group	Comparison Group	Intervention Group	Comparison Group	
Fruits and vegetables combined (cups per day)					
BASICS Plus	2.22 (0.07)	2.64 (0.07)	2.50 (0.08)	2.60 (0.08)	0.31** (0.10, 0.53)
BASICS	2.46 (0.07)	2.64 (0.07)	2.66 (0.08)	2.60 (0.08)	0.24* (0.03, 0.45)
BASICS Plus vs. BASICS	2.22 (0.07)	2.46 (0.07)	2.50 (0.08)	2.66 (0.08)	0.07 (−0.15, 0.29)
LEAP2	2.26 (0.08)	2.30 (0.09)	2.32 (0.08)	2.29 (0.09)	0.06 (−0.20, 0.32)
Fruits (cups per day)					
BASICS Plus	1.19 (0.04)	1.38 (0.04)	1.34 (0.05)	1.36 (0.05)	0.17* (0.02, 0.32)
BASICS	1.28 (0.04)	1.38 (0.04)	1.42 (0.05)	1.36 (0.05)	0.16* (0.01, 0.31)
BASICS Plus vs. BASICS	1.19 (0.04)	1.28 (0.04)	1.34 (0.05)	1.42 (0.05)	0.01 (−0.14, 0.17)
LEAP2	1.14 (0.04)	1.15 (0.05)	1.20 (0.05)	1.18 (0.05)	0.02 (−0.14, 0.18)
Vegetables (cups per day)					
BASICS Plus	1.04 (0.04)	1.26 (0.04)	1.16 (0.04)	1.24 (0.04)	0.13* (0.03, 0.24)
BASICS	1.18 (0.04)	1.26 (0.04)	1.24 (0.04)	1.24 (0.04)	0.07 (−0.03, 0.18)
BASICS Plus vs. BASICS	1.04 (0.04)	1.18 (0.04)	1.16 (0.04)	1.24 (0.04)	0.06 (−0.05, 0.17)
LEAP2	1.12 (0.04)	1.15 (0.05)	1.12 (0.05)	1.11 (0.05)	0.05 (−0.10, 0.20)
Used 1% or fat-free milk during past week[b]					
BASICS Plus	36.31 (3.79)	40.93 (3.90)	44.42 (4.17)	42.37 (4.07)	1.32* (1.0, 1.74)
BASICS	36.68 (3.78)	40.93 (3.90)	37.80 (3.98)	42.37 (4.07)	0.99 (0.75, 1.30)
BASICS Plus vs. BASICS	36.31 (3.79)	36.68 (3.78)	44.42 (4.17)	37.80 (3.98)	1.34* (1.01, 1.77)

[a] Program impact (with 95 percent confidence limits) was estimated via difference-in-difference models comparing change across time in the intervention versus comparison groups. Impact estimates provided as odds ratios for dichotomous variables.

[b] Dichotomous variable indicates proportion responding yes.

** Indicates statistical significance if the *p*-value is less than or equal to 0.01.

* Indicates statistical significance if the *p*-value is less than or equal to 0.05.

Notes: General linear mixed models (SAS PROC MIXED) and generalized linear models (SAS PROC GLIMMIX) were used to evaluate the program impact while accounting for the clustering of children within schools. Covariates in the model included child age, child sex, household size, respondent race/ethnicity, respondent age, and respondent sex. SE = standard error. CI = confidence interval.

Source: Parent Baseline and Follow-Up Surveys, 2011 and 2012.

2. Findings Related to Secondary Impacts

Tables V-2 through V-4 present the results of the secondary impact models for the child-focused programs for short-term outcomes, child mediating factors, and parent mediating factors, respectively. Only the outcomes and mediating factors common to both programs are presented.

- **Short-term outcomes for children.**

As shown in Table V-2, some short-term outcomes were positively affected by the BASICS and BASICS Plus interventions. Compared with the comparison group, the BASICS Plus intervention increased the number of days on which children ate more than one kind of vegetable, while the BASICS intervention increased the number of days on which children ate more than one kind of fruit. The LEAP2 program did not have an impact on the variety of fruits or vegetables children consumed each day. None of the programs had an impact on the frequency at which the child asked the parent to buy certain fruits or vegetables.

- **Mediating factors for children.**

The impact of the interventions on children's willingness to try a new kind of fruit or vegetable varied (see Table V-3). Parents of children in both the BASICS Plus and BASICS interventions reported increased willingness of their children to try a new kind of fruit. Additionally, this increased willingness was significantly higher for the BASICS Plus group, compared with the BASICS group. Neither BASICS intervention had an impact on children's willingness to try a new vegetable, although a positive trend was observed for the BASICS Plus intervention. The LEAP2 program did not have an impact on children's willingness to try new fruits or vegetables.

- **Mediating factors for parents/household.**

The impact of the intervention on mediating factors for parents or the household was minimal (see Table V-4). The LEAP2 program had a statistically significant impact on the at-home availability of fruits and vegetables. None of the programs led to an increase in parental offerings of fruit or vegetables for a snack or at dinner or parents' encouragement to try new fruits or vegetables. This may be due to the limited parent and caregiver reach and engagement. As previously discussed, many key informants identified reaching and engaging parents and caregivers as the greatest challenge to effectively implementing SNAP-Ed programs targeted at children. More needs to be done to carry the information taught in the classroom to the home to increase the impact of these programs, especially for LEAP2 since it had no impact on children's at-home fruit and vegetable consumption.

Table V-2. Secondary Impacts for Child-Focused Programs: Short-Term Outcomes

Measure	Model-Adjusted Baseline Means (SE)		Model-Adjusted Follow-Up Means (SE)		Estimated Impact[a] (95% CI)
	Intervention Group	Comparison Group	Intervention Group	Comparison Group	
Child Ate a Variety of Fruits or Vegetables Each Day (days per week)					
Fruits					
BASICS Plus	3.19 (0.12)	3.61 (0.12)	3.47 (0.13)	3.61 (0.13)	0.28 (−0.14, 0.70)
BASICS	3.23 (0.12)	3.61 (0.12)	3.72 (0.13)	3.61 (0.13)	0.47* (0.06, 0.89)
BASICS Plus vs. BASICS	3.19 (0.12)	3.23 (0.12)	3.47 (0.13)	3.72 (0.13)	−0.20 (−0.62, 0.23)
LEAP2	3.11 (0.11)	3.21 (0.12)	3.18 (0.11)	3.18 (0.12)	0.11 (−0.24, 0.46)
Vegetables					
BASICS Plus	3.31 (0.13)	3.86 (0.13)	3.55 (0.15)	3.69 (0.14)	0.41* (0.07, 0.75)
BASICS	3.51 (0.13)	3.86 (0.13)	3.58 (0.15)	3.69 (0.14)	0.24 (−0.10, 0.59)
BASICS Plus vs. BASICS	3.31 (0.13)	3.51 (0.13)	3.55 (0.15)	3.58 (0.15)	0.17 (−0.18, 0.52)
LEAP2	3.53 (0.11)	3.57 (0.11)	3.55 (0.11)	3.48 (0.12)	0.10 (−0.27, 0.48)
Child Asked Parent to Buy Certain Fruits or Vegetables[b]					
Fruits					
BASICS Plus	2.30 (0.07)	2.48 (0.06)	2.32 (0.07)	2.56 (0.07)	−0.06 (−0.25, 0.13)
BASICS	2.35 (0.06)	2.48 (0.06)	2.50 (0.07)	2.56 (0.07)	0.07 (−0.11, 0.26)
BASICS Plus vs. BASICS	2.30 (0.07)	2.35 (0.06)	2.32 (0.07)	2.50 (0.07)	−0.13 (−0.32, 0.06)
LEAP2	2.33 (0.04)	2.45 (0.04)	2.35 (0.04)	2.35 (0.04)	0.11 (−0.04, 0.26)
Vegetables					
BASICS Plus	1.48 (0.07)	1.57 (0.07)	1.62 (0.08)	1.81 (0.08)	−0.10 (−0.27, 0.08)
BASICS	1.58 (0.07)	1.57 (0.07)	1.71 (0.08)	1.81 (0.08)	−0.11 (−0.28, 0.07)
BASICS Plus vs. BASICS	1.48 (0.07)	1.58 (0.07)	1.62 (0.08)	1.71 (0.08)	0.01 (−0.17, 0.19)
LEAP2	1.54 (0.06)	1.62 (0.07)	1.51 (0.06)	1.62 (0.07)	−0.03 (−0.15, 0.10)

[a] Program impact (with 95 percent confidence limits) was estimated via difference-in-difference models comparing change across time in the intervention versus comparison groups.

[b] Response categories converted to continuous variable, with 0 = never and 4 = always.

* Indicates statistical significance if the *p*-value is less than or equal to 0.05.

Notes: General linear mixed models (SAS PROC MIXED) used to evaluate the program impact while accounting for the clustering of children within schools. Covariates in the model included child age, child sex, household size, respondent race/ethnicity, respondent age, and respondent sex. SE = standard error. CI = confidence interval.

Source: Parent Baseline and Follow-Up Surveys, 2011 and 2012.

Table V-3. Secondary Impacts for Child-Focused Programs: Child Mediating Factors

Measure	Model-Adjusted Baseline Means (SE)		Model-Adjusted Follow-Up Means (SE)		Estimated Impact[a] (95% CI)
	Intervention Group	Comparison Group	Intervention Group	Comparison Group	
Child's Willingness to Try New Fruits or Vegetables (Percentage responding yes)					
Fruits					
BASICS Plus	63.87 (2.27)	74.76 (2.09)	81.21 (2.28)	73.71 (2.44)	2.85** (1.82, 3.65)
BASICS	66.05 (2.29)	74.76 (2.09)	76.69 (2.43)	73.71 (2.44)	1.79** (1.28, 2.49)
BASICS Plus vs. BASICS	63.87 (2.27)	66.05 (2.29)	81.21 (2.28)	76.69 (2.43)	1.45* (1.01, 2.06)
LEAP2	56.43 (2.40)	58.45 (2.54)	58.57 (2.53)	55.90 (2.72)	1.21 (0.87, 1.68)
Vegetables					
BASICS Plus	47.21 (3.15)	51.30 (3.12)	53.92 (3.45)	48.05 (3.37)	1.49† (0.94, 2.35)
BASICS	45.12 (3.11)	51.30 (3.12)	47.76 (3.43)	48.05 (3.37)	1.27 (0.80, 1.99)
BASICS Plus vs. BASICS	47.21 (3.15)	45.12 (3.11)	53.92 (3.45)	47.76 (3.43)	1.18 (0.74, 1.86)
LEAP2	37.05 (2.52)	37.69 (2.69)	37.95 (2.66)	37.88 (2.83)	1.03 (0.74, 1.43)

[a] Program impact (with 95 percent confidence limits) was estimated via difference-in-difference models comparing change across time in the intervention versus comparison groups. Impact estimates provided as odds ratios.

** Indicates statistical significance if the *p*-value is less than or equal to 0.01.

* Indicates statistical significance if the *p*-value is less than or equal to 0.05.

† Indicates trend, $0.05 < p <= 0.10$.

Notes: Generalized linear mixed models (SAS PROC GLIMMIX) used to evaluate the program impact while accounting for the clustering of children within schools. Covariates in the model included child age, child sex, household size, respondent race/ethnicity, respondent age, and respondent sex. SE = standard error. CI = confidence interval.

Source: Parent Baseline and Follow-Up Surveys, 2011 and 2012.

Table V-4. Secondary Impacts for Child-Focused Programs: Parent or Household Mediating Factors

Measure	Model-Adjusted Baseline Means (SE)		Model-Adjusted Follow-Up Means (SE)		Estimated Impact[a] (95% CI)
	Intervention Group	Comparison Group	Intervention Group	Comparison Group	
At-Home Availability of Fruits and Vegetables[b]					
BASICS Plus	5.47 (0.12)	5.71 (0.12)	5.66 (0.13)	5.69 (0.13)	0.21 (−0.10, 0.53)
BASICS	5.43 (0.12)	5.71 (0.12)	5.70 (0.13)	5.69 (0.13)	0.29† (−0.02, 0.60)
BASICS Plus vs. BASICS	5.47 (0.12)	5.43 (0.12)	5.66 (0.13)	5.70 (0.13)	−0.08 (−0.40, 0.24)
LEAP2	4.70 (0.09)	5.06 (0.09)	4.98 (0.09)	5.14 (0.10)	0.19* (0.01, 0.38)
Frequency of Parental Offerings of Fruit for a Snack and/or at Dinner (days per week)					
Fruit for a snack					
BASICS Plus	2.74 (0.14)	3.23 (0.14)	3.11 (0.15)	3.59 (0.15)	0.01 (−0.46, 0.48)
BASICS	2.79 (0.14)	3.23 (0.14)	3.27 (0.15)	3.59 (0.15)	0.12 (−0.35, 0.59)
BASICS Plus vs. BASICS	2.74 (0.14)	2.79 (0.14)	3.11 (0.15)	3.27 (0.15)	−0.11 (−0.59, 0.36)
LEAP2	3.03 (0.11)	3.06 (0.12)	3.02 (0.12)	3.07 (0.12)	−0.02 (−0.40, 0.35)
Fruit at dinner					
BASICS Plus	1.94 (0.15)	2.04 (0.15)	2.26 (0.16)	2.26 (0.16)	0.10 (−0.32, 0.51)
BASICS	1.83 (0.15)	2.04 (0.15)	2.17 (0.16)	2.26 (0.16)	0.12 (−0.29, 0.53)
BASICS Plus vs. BASICS	1.94 (0.15)	1.83 (0.15)	2.26 (0.16)	2.17 (0.16)	−0.03 (−0.44, 0.39)
LEAP2	1.26 (0.10)	1.21 (0.11)	1.59 (0.10)	1.51 (0.11)	0.04 (−0.23, 0.31)
Frequency of Parental Offerings of Vegetables for a Snack and/or at Dinner (days per week)					
Vegetables for a snack					
BASICS Plus	1.37 (0.12)	1.64 (0.11)	1.63 (0.13)	1.75 (0.12)	0.15 (−0.12, 0.43)
BASICS	1.48 (0.12)	1.64 (0.11)	1.76 (0.12)	1.75 (0.12)	0.16 (−0.11, 0.44)
BASICS Plus vs. BASICS	1.37 (0.12)	1.48 (0.12)	1.63 (0.13)	1.76 (0.12)	−0.01 (−0.29, 0.27)
LEAP2	1.38 (0.09)	1.50 (0.10)	1.51 (0.10)	1.60 (0.10)	0.04 (−0.24, 0.31)
Vegetables at dinner					
BASICS Plus	4.21 (0.12)	4.91 (0.12)	4.28 (0.13)	5.07 (0.13)	−0.09 (−0.44, 0.26)
BASICS	4.26 (0.12)	4.91 (0.12)	4.44 (0.13)	5.07 (0.13)	0.02 (−0.33, 0.37)
BASICS Plus vs. BASICS	4.21 (0.12)	4.26 (0.12)	4.28 (0.13)	4.44 (0.13)	−0.11 (−0.47, 0.25)
LEAP2	4.47 (0.10)	4.46 (0.10)	4.52 (0.10)	4.43 (0.11)	0.07 (−0.25, 0.39)

(continued)

Table V-4. Secondary Impacts for Child-Focused Programs: Parent or Household Mediating Factors (continued)

Measure	Model-Adjusted Baseline Means (SE)		Model-Adjusted Follow-Up Means (SE)		Estimated Impact[a] (95% CI)
	Intervention Group	Comparison Group	Intervention Group	Comparison Group	
Parent Can Encourage Child to Try New Fruits or Vegetables[c]					
BASICS Plus	35.10 (2.89)	35.37 (2.84)	42.71 (3.38)	36.48 (3.15)	1.31 (0.92, 1.88)
BASICS	37.54 (2.91)	35.37 (2.84)	38.79 (3.29)	36.48 (3.15)	1.00 (0.70, 1.43)
BASICS Plus vs. BASICS	35.10 (2.89)	37.54 (2.91)	42.71 (3.38)	38.79 (3.29)	1.31 (0.91, 1.88)
LEAP2	32.01 (2.47)	35.67 (2.69)	31.58 (2.61)	37.82 (2.90)	0.89 (0.61, 1.32)

[a] Program impact (with 95 percent confidence limits) was estimated via difference-in-difference models comparing change across time in the intervention versus comparison groups. Impact estimates provided as odds ratios for dichotomous variables.

[b] Index score, 0–10 for BASICS and 0–9 for LEAP2.

[c] Dichotomous variable indicates the proportion responding "strongly agree."

* Indicates statistical significance if the *p*-value is less than or equal to 0.05.

† Indicates trend, 0.05 < p <= 0.10.

Notes: General linear mixed models (SAS PROC MIXED) and generalized linear models (SAS PROC GLIMMIX) used to evaluate the program impact while accounting for the clustering of children within schools. Covariates in the model included child age, child sex, household size, respondent race/ethnicity, respondent age, and respondent sex. SE = standard error. CI = confidence interval.

Source: Parent Baseline and Follow-Up Surveys, 2011 and 2012.

C. Summary of Findings for the ESLS Program

1. Findings Related to Primary Impacts

As shown in Table V-5, the ESLS program had a statistically significant impact on participants' average daily consumption of fruits, vegetables, and fruits and vegetables combined.

Table V-5. Primary Impacts for the Evaluation of MSUE's ESLS Program

Measure	Model-Adjusted Baseline Means (SE)		Model-Adjusted Follow-Up Means (SE)		
	Intervention Group	Comparison Group	Intervention Group	Comparison Group	Estimated Impact[a] (95% CI)
Fruits and vegetables combined (cups per day)	2.46 (0.11)	2.59 (0.10)	3.05 (0.11)	2.65 (0.10)	0.52** (0.23, 0.82)
Fruits (cups per day)	1.26 (0.06)	1.29 (0.06)	1.47 (0.07)	1.31 (0.06)	0.20* (0.01, 0.38)
Vegetables (cups per day)	1.20 (0.06)	1.30 (0.05)	1.55 (0.06)	1.34 (0.05)	0.31** (0.16, 0.47)

[a] Program impact (with 95% confidence limits) estimated via difference-in-difference models comparing change across time in the intervention versus comparison groups.

** Indicates statistical significance if the *p*-value is less than or equal to 0.01.

* Indicates statistical significance if the *p*-value is less than or equal to 0.05.

Notes: General linear mixed models (SAS PROC MIXED) were used to evaluate the program impact while accounting for the clustering of participants within centers. Covariates in the model included age, sex, household size, health status, employment status, education, and race and ethnicity. SE = standard error. CI = confidence interval.

Source: Participant Survey, March–May 2012 (Baseline) and April–July 2012 (Follow-Up).

2. Findings Related to Secondary Impacts

As shown in Tables V-6 and V-7, the ESLS program had limited effect on the short-term outcomes and mediating factors of interest. There was a significant increase in the proportion of participants who agreed or strongly agreed that they add fruits or vegetables as ingredients during meal preparation to help them eat more fruits and vegetables (odds ratio = 1.93, $p < 0.05$).

Table V-6. Secondary Impacts for the Evaluation of MSUE's ESLS Program: Short-Term Outcomes

Measure	Model-Adjusted Baseline Means (SE)		Model-Adjusted Follow-Up Means (SE)		Estimated Impact[a] (95% CI)
	Intervention Group	Comparison Group	Intervention Group	Comparison Group	
Ate fruits or vegetables for snacks[b]	4.32 (0.19)	3.95 (0.17)	4.34 (0.19)	4.11 (0.18)	−0.14 (−0.75, 0.47)
Ate variety of fruits[b]	3.88 (0.16)	3.84 (0.15)	4.13 (0.17)	3.99 (0.15)	0.10 (−0.34, 0.55)
Ate variety of vegetables[b]	3.46 (0.17)	3.42 (0.15)	4.01 (0.17)	3.57 (0.15)	0.40† (0.00, 0.80)
Usually eat at least one fruit or vegetable at each meal[c]	76.63 (3.52)	80.19 (2.92)	81.98 (3.04)	83.30 (2.65)	1.13 (0.68, 1.87)
Usually eat fruit for dessert instead of cookies, cake, pie, or ice cream[c]	54.53 (3.95)	55.27 (3.52)	69.11 (3.52)	62.94 (3.37)	1.36 (0.88, 2.09)
Add fruits or vegetables as ingredients to meals to help eat more fruits or vegetables[c]	78.28 (3.19)	81.17 (2.63)	86.33 (2.51)	79.68 (2.73)	1.93* (1.14, 3.27)

[a] Program impact (with 95% confidence limits) estimated via difference-in-difference models comparing change across time in the intervention versus comparison groups. Impact estimates provided as odds ratios for dichotomous variables.

[b] Reported as the number of days in the past week.

[c] Dichotomous variable indicates the proportion responding "Agree" or "Strongly agree" vs. "Disagree" or "Strongly disagree."

* Indicates statistical significance if the *p*-value is less than or equal to 0.05.

† Indicates trend, 0.05 < p <= 0.10.

Notes: General linear mixed models (SAS PROC MIXED) for continuous impact variables and generalized linear models (SAS PROC GLIMMIX) for dichotomous impact variables were used to evaluate the program impact while accounting for the clustering of participants within centers. Covariates in the model included age, sex, household size, health status, employment status, education, and race and ethnicity. SE = standard error. CI = confidence interval. SE = standard error. CI = confidence interval.

Source: Participant Survey, March–May 2012 (Baseline) and April–July 2012 (Follow-Up).

Table V-7. Secondary Impacts for the Evaluation of MSUE's ESLS Program: Mediating Factors

Measure	Model-Adjusted Baseline Means (SE)		Model-Adjusted Follow-Up Means (SE)		Estimated Impact[a] (95% CI)
	Intervention Group	Comparison Group	Intervention Group	Comparison Group	
Availability of fruits and vegetables[b]	5.63 (0.16)	5.74 (0.15)	5.70 (0.16)	5.56 (0.15)	0.24 (−0.22, 0.70)
Sometimes ask friends or family members for help shopping for food[c]	23.15 (4.25)	29.20 (4.55)	19.67 (3.86)	22.92 (3.97)	1.13 (0.72, 1.77)
Can afford fruits or vegetables in the store[c]	81.87 (2.77)	81.89 (2.49)	83.68 (2.63)	79.79 (2.63)	1.30 (0.78, 2.17)
Buying more fruits or vegetables would be hard on budget[c]	59.22 (4.52)	60.87 (4.12)	54.51 (4.61)	56.41 (4.23)	0.99 (0.65, 1.52)

[a] Program impact (with 95% confidence limits) estimated via difference-in-difference models comparing change across time in the intervention versus comparison groups. Impact estimates provided as odds ratios for dichotomous variables.

[b] Index score (0–9) based on reported household availability of nine fruits and vegetables.

[c] Dichotomous variable indicates the proportion responding "Agree" or "Strongly agree" vs. "Disagree" or "Strongly disagree."

Notes: General linear mixed models (SAS PROC MIXED) for continuous impact variables and generalized linear models (SAS PROC GLIMMIX) for dichotomous impact variables were used to evaluate the program impact while accounting for the clustering of participants within centers. Covariates in the model included age, sex, household size, health status, employment status, education, and race and ethnicity. SE = standard error. CI = confidence interval.

Source: Participant Survey, March–May 2012 (Baseline) and April–July 2012 (Follow-Up).

D. Limitations of the Independent Impact Evaluations

A well-designed impact evaluation lets the evaluator draw a reasonable and supportable conclusion about the effect of the program and the likelihood that any changes observed in the sample participants would replicate to the broader target population. This is accomplished with a design that provides an unbiased estimate of the program impact while eliminating or reducing plausible alternative explanations for program effects. No design, however, is free from potential flaws, and it is the evaluator's responsibility to note the design-related factors that may have introduced bias into program estimates or opened the door to reasonable alternatives to explain program impacts. The sections that follow identify the limitations of the independent impact evaluation with regard to measurement and instrument effects and design issues.

1. Measurement and Instrumentation Effects

▲ **Limited opportunity for change because many children may eat up to two meals a day plus snacks in the school or childcare setting.**

The decision to design the evaluations around a program impact of 0.30 cups was based on a change that would be viewed as meaningful from a public health perspective and was supported by a recent meta-analysis (Knai, Pomerleau, Lock, & McKee, 2006). However, the programs examined by Knai et al. (2006) involved assessing total daily food intake, while the programs targeted to children

focused on parents reporting only their child's at-home food intake. Because parents are unable to observe intakes away from home, the decision was made for the independent evaluation to assess at-home consumption only. Children, especially low-income children receiving free and reduced-price breakfast and lunch, may eat up to two of their three daily meals plus snacks while at school, thus this may limit parental opportunity to observe and report change in their children's fruit and vegetable consumption.

2. Design Issues

▲ **Attrition from the evaluation study.**

Attrition occurs when participants who completed a baseline survey fail to complete a follow-up survey. In general, information is not available on why participants do not provide data at follow-up. If, however, attrition is related to some characteristic of the participants, then examining data on those who complete the follow-up survey only would present a biased interpretation of the potential program impact on individuals in the broader population. The ability to make unbiased statements about a program's potential impact is called generalizability.

For the UKCES and INN demonstration projects, the potential impact of attrition from the evaluation study on generalizability was investigated by comparing the pre-intervention similarity of study participants who provided follow-up data and those who did not. This comparison was made by fitting a logistic regression model that regressed completion status on variables that describe survey responders and the characteristics of their children. This analysis provided odds ratios that highlight any association between the descriptive characteristics of participants and the likelihood of providing data at follow-up. An attrition analysis was not conducted for the MSUE demonstration project because of the low attrition rate (2 percent).

The attrition rate was 15 percent for the UKCES evaluation and 23 percent for the INN evaluation. For UKCES, differences in completion were associated with race and ethnicity, with White respondents more likely to complete the follow-up survey than other races and ethnicities. For the UKCES and INN evaluations, older respondents (45 or older) were more likely to complete the follow-up survey compared with younger respondents (18 to 34). This differential response may limit the generalizability of the study findings for children with parents aged 18 to 34. For UKCES, because the study population is predominately White (96%), the differential response is not a concern.

▲ **Need to use a quasi-experimental design for the INN and MSUE evaluations.**

The UKCES evaluation used a fully randomized experimental design, and the INN and MSUE evaluations used quasi-experimental designs. Experimental designs are preferred for their recognized ability to control for many of the potential threats to validity, such as secular trends and maturation. The ability to rule out selection bias is one of the main benefits of randomization. Selection bias occurs when some factor related to the program treatment leads participants to self-select membership in one of the experimental conditions.

Quasi-experimental designs can have many of the same features as fully experimental designs, but they lack the opportunity to make random assignment. The evaluation of the INN and MSUE programs included a nonequivalent comparison group instead of a randomized control. As the term suggests, one cannot claim that the members of the comparison group are equivalent to the members of the intervention group as one can in a randomized design, so it is impossible to completely rule

out selection bias. However, the inclusion of a comparison group helps rule out such validity threats as maturation. Additionally, baseline comparisons give a measure of the similarity of the two groups on many of the variables measured.

- **Self-selection bias for the MSUE evaluation.**

For the evaluation of MSUE's ESLS program, it appears that program participants were highly motivated to improve their nutrition behaviors as evidenced by findings from the participant survey on reasons for choosing to participate in ESLS; thus, there may be some evidence of selection bias. The majority of respondents (73 percent) reported that they wanted to eat healthier, and 63 percent wanted to improve their health. These questions were not asked of the comparison group, although similar procedures were used to recruit participants for the comparison group, with the exception that the comparison group participants were told that (1) they would only need to attend two sessions, the baseline and follow-up data collection; and (2) they would take part in a four-week nutrition education program after the follow-up data collection.

Chapter VI • Integrated Findings from the Assessment of the Self-Evaluations

The demonstration projects were evaluated both to determine the success of the nutrition education programs in effecting behavioral change and to validate the soundness of their evaluation methodology. This chapter summarizes the findings from the assessment of the self-evaluations conducted by the IAs for the three demonstration projects. The sections that follow provide a summary of each project's evaluation approach; common strengths and limitations of the self-evaluations; a summary of findings of the self-evaluations; and, lastly, recommendations for improving IAs' evaluation of SNAP-Ed programs.

A. Summary of Evaluation Approaches

Exhibits VI-1 through VI-3 summarize the evaluation approaches used by the projects for their self-evaluations. The evaluation approach used by each demonstration project is described below, and similarities and differences in the approaches used are discussed from a cross-project perspective.

1. Evaluation Design for the INN BASICS Self-Evaluation

Exhibit VI-1 outlines the key characteristics of the INN self-evaluation. Using the same quasi-experimental design used for the independent evaluation, pre- and post-surveys were administered to students in the intervention and comparison groups. The primary outcome measures included fruit and vegetable preferences, willingness to try new fruits and vegetables, and increased ability to select healthy snacks (including milk) at home. Fixed-effects between subjects analysis of variance was used to compare pre–post differences among the three arms of the study (BASICS Plus, BASICS, and comparison).

Key Findings

Strengths of the Self-Evaluations

- Common strengths of the three self-evaluations were the use of a viable comparison strategy (the same research design used by the independent contractor), acceptable retention levels, and minimal missing data for the impact analysis.
- INN adequately trained their data collectors and provided sufficient oversight during data collection.
- UKCES used photographic assessments of child's plates at school, a data collection approach that does not rely on self-reports.
- MSUE used 24-hour food recalls for collecting information on fruit and vegetable consumption, the gold standard for measuring dietary intake.

Limitations of the Self-Evaluations

- INN's evaluation used an outcome measure that was not very sensitive to change.
- UKCES's measurement and data collection approach had several limitations: using fruit and vegetable calendars to collect data on consumption, which may not be a reliable approach for elementary-school children; having the control group complete the fruit and vegetable calendars, which was part of the intervention; and limiting the photographic assessment to a subset of schools.
- MSUE experienced difficulties in enrolling the specified number of participants meeting the age-eligibility criterion in the study, which resulted in moving from an experimental to a quasi-experimental design.

Exhibit VI-1. Evaluation Design for the INN BASICS Self-Evaluation

Characteristic	Description
Study population	Third-grade students attending eligible schools in four Iowa school districts (Council Bluffs, Waterloo, Des Moines, and Davenport)
Study design and sampling strategy	Quasi-experimental research design with 11 schools in each of three conditions (BASICS Plus, BASICS, comparison)
Primary outcome measures	Increased preferences for fruits and vegetables, increased willingness to try new fruits and vegetables, and increased ability to select healthy snacks (including milk) at home (self-efficacy)
Data collection	Pre- and post-intervention surveys administered to students within the classroom
Number of pre/post matched surveys	BASICS Plus (n = 375), BASICS (n = 359), comparison (n = 331)
Data analysis	Fixed-effects, between-subjects analysis of variance was employed to compare pre-post differences across the three arms, using F-tests to assess overall differences among the three arms and Bonferroni multiple comparisons to provide conservative estimates

2. Evaluation Design for the UKCES LEAP2 Self-Evaluation

Exhibit VI-2 outlines the key characteristics of the UKCES self-evaluation, which used the same fully randomized experimental design as the independent evaluation. The primary outcomes were willingness to try fruits and vegetables and consumption of fruits and vegetables (at home and at school). Students in the intervention and control groups completed fruit and vegetable calendars to report their daily intake of fruits and vegetables at home and school. Photographic assessments of school lunches (before and after lunch) were taken at pre- and post-intervention in two schools per county to assess children's consumption of fruits and vegetables at school. Multilevel analysis or hierarchical linear models (HLM) were used to assess the effect of the intervention, classroom, and school on changes in fruit and vegetable consumption and the other outcomes of interest. Analysis of Variance (ANOVA) models were used to analyze data from the photographic assessments for differences in the average number of servings consumed.

3. Evaluation Design for the MSUE ESLS Self-Evaluation

Exhibit VI-3 outlines the key characteristics of the MSUE self-evaluation, which used the same quasi-experimental design as the independent evaluation, with the exception of one additional intervention center that was added after the cutoff for data collection. The primary outcome measures were an increase in average daily consumption of fruits by 0.5 cups and an increase in average daily consumption of vegetables by 0.5 cups. MSUE used 24-hour food recalls administered in a group setting to collect information on dietary intake and surveys at pre- and post-intervention, and it used the Computerized Nutrient Analysis and the MyPyramid.gov foods database to perform nutrient analysis of the food recall data. To estimate the impact of the ESLS program, MSUE used generalized linear models (GLM) to determine the relationship between the study groups and the study outcomes while controlling for the suspected confounding effects of demographic and other study variables.

Exhibit VI-2. Evaluation Design for the UKCES LEAP2 Self-Evaluation

Characteristic	Description
Study population	First- through third-grade students at eligible schools in Laurel and Perry Counties
Study design and sampling strategy	Eight matched pairs of schools, with random assignment to the intervention or control group
Primary outcome measures	Increased willingness to try fruits and vegetables and increased consumption of fruits and vegetables (at home and at school)
Data collection	Photographic assessments of in-school lunch consumption were conducted pre- and post-intervention in a subset of schools Intervention and control students completed daily fruit and vegetable calendars at baseline and each week during the eight-week intervention period
Number of completed assessments/calendars	Photographic assessment: two schools per county were chosen based on comparable size and student demographics and school cooperation Intervention group = 185 (pre-test), 185 (post-test) Control group = 180 (pre-test), 199 (post-test) Self-reported daily fruit and vegetable calendars: census of students enrolled in intervention and control classrooms Intervention group = 733 Control group = 871
Data analysis	*t*-tests, ANOVA, linear regressions, and multilevel analysis or HLM

Exhibit VI-3. Evaluation Design for the MSUE ESLS Self-Evaluation

Characteristic	Description
Study population	Low-income older adults attending senior centers in 13 Michigan counties
Study design and sampling strategy	Quasi-experimental research design: 18 intervention centers and 16 comparison centers[a]
Primary outcome measures	Increase in average daily consumption of fruits by 0.5 cups Increase in average daily consumption of vegetables by 0.5 cups
Data collection	24-hour food recalls conducted at baseline (first session) and follow-up (sixth session) in a group setting
Number of completed dietary recalls at follow-up (60–80 years)	Intervention group = 258 Comparison group = 308
Data analysis	Generalized linear models (GLM) with controls for suspected confounding of demographic and other variables that were adjusted for clustering when necessary; also ran a series of simple (ordinary least squares) difference-in-difference regression models that included the same covariates used in GLM analyses

[a] MSUE conducted the intervention and evaluation study in one additional center in which the independent evaluator did not collect data because it was added after the cutoff date for data collection.

4. Similarities and Differences Among the Demonstration Projects' Self-Evaluations

The projects used the same study design and sampling strategy used by the independent evaluator. Thus, INN and MSUE employed a quasi-experimental design, and UKCES used a fully randomized experimental design as described in Chapter V.

UKCES and MSUE directly assessed the impact of their interventions on fruit and vegetable consumption, whereas the primary outcome for INN consisted of a summary index of fruit and vegetable preference. As specified by FNS, the independent evaluations were limited to nutritional outcomes, whereas MSUE also included an outcome measure for amount of moderate physical activity consistent with the program's objective to increase physical activity.

All three IAs collected data at baseline and follow-up from intervention participants and the control/comparison group. INN surveyed students, UKCES asked students to complete fruit and vegetable calendars and conducted in-school photographic assessments of children's plates, and MSUE conducted 24-hour food recalls. The type of data analysis varied depending on the type of data collected.

B. Common Strengths and Limitations of the Self-Evaluations

To assess the quality of the self-evaluations, the independent evaluator adapted a scoring tool based on the one used by the Center for Substance Abuse Prevention in developing the National Registry of Evidence-Based Programs and Practices database (U.S. Department of Health and Human Services, Substance Abuse and Mental Health Services Administration, 2011). In addition to assigning a numerical score to the eight evaluation components, the reviewers provided a qualitative description of the strengths and limitations of each self-evaluation.

Exhibit VI-4 lists the strengths of the self-evaluations, and Exhibit VI-5 lists the limitations of the self-evaluations in terms of the study design and measures, instrumentation, data collection, and data analysis. The strengths and limitations of each evaluation varied as summarized below.

A common strength of the three self-evaluations was the use of a viable comparison strategy (the same research design used by the independent contractor) to reduce plausible alternative explanations of program impact. Other strengths common to the three self-evaluations were acceptable retention levels and minimal missing data for the impact analysis, which helps minimize survey and item nonresponse bias respectively. Both MSUE and INN adequately trained their data collectors and provided sufficient oversight during data collection. Other strengths included MSUE's use of 24-hour food recalls for collecting information on fruit and vegetable consumption, the gold standard for measuring dietary intake. UKCES used photographic assessments of children's plates, a data collection approach that does not rely on self-reports; however, the assessment was collected in a subset of the schools, thus limiting the value of this analysis.

There were no limitations common to all three self-evaluations. INN and UKCES did not determine the anticipated size of the program impact on the target audience before conducting the intervention, and did not conduct an attrition analysis to assess the potential impact of attrition from the evaluation study on generalizability of the impact analysis findings.

Limitations of INN's evaluation were the use of an outcome measure that was not very sensitive to change and the impact analysis did not appropriately take into account the complexity of the evaluation

design (clustering of individuals within schools); thus the level of variation in measured outcomes is likely to be underestimated.

For UKCES, there were limitations in measurement and data collection, which included using fruit and vegetable calendars to collect consumption data, which may not be a reliable approach for elementary-school children; having the control group complete the fruit and vegetable calendars, which was part of the intervention; and limiting the photographic assessment to a subset of schools. The primary limitation of MSUE's evaluation centered on the difficulties that it experienced in enrolling the specified number of participants meeting the age eligibility criterion in the study.

Exhibit VI-4. Summary of Strengths of the Self-Evaluations, by Demonstration Project

Strengths	BASICS (INN)	LEAP2 (UKCES)	ESLS (MSUE)
Study Design and Measures			
Used a comparison or control group	✓	✓	✓
Stated the research objectives and hypotheses in quantifiable terms			✓
Instrumentation			
Used 24-hour dietary recalls to measure dietary intake (the gold standard for measuring intake)			✓
Used data collection approach to measure dietary intake that did not rely on self-reports (photographic assessments)		✓	
Data Collection			
Conducted training of data collectors before data collection and provided sufficient oversight of data collectors during data collection, which resulted in uniform data collection across schools or centers	✓		✓
Controlled data collection adequately (e.g., baseline data was collected before intervention period to rule out alternative explanations of program effects)	✓		✓
Achieved acceptable retention levels	✓	✓	✓
Data Analysis			
Conducted attrition analysis to compare characteristics of those who provided data at follow-up and those who did not			✓
Achieved minimal missing data (survey item nonresponse) for the analysis	✓	✓	✓

Exhibit VI-5. Summary of Limitations of the Self-Evaluations, by Demonstration Project

Limitations	BASICS (INN)	LEAP2 (UKCES)	ESLS (MSUE)
Study Design and Measures			
Some or all outcome measures and research objectives were not stated in quantifiable terms or based on relevant evidence-based literature	✓	✓	
Instrumentation			
Items used to assess program impacts did not appear to be sensitive to change	✓		
Used fruit and vegetables calendars, which may not provide reliable consumption data with elementary-school children		✓	
Data Collection			
Lack of quality control during data collection		✓	
Difficulties in enrolling study participants			✓
Data Analysis			
Data analysis did not appropriately take into account the complexity of the evaluation design (clustering of individuals within schools or centers)	✓		
Did not conduct attrition analysis to investigate the potential impact of attrition on generalizability	✓	✓	

C. Summary of the Findings From the Self-Evaluations

Exhibit VI-6 summarizes the key findings of each of the self-evaluations and how these findings compare with the findings from the independent evaluations. When comparing the findings from the self-evaluations and the independent evaluations, it is important to bear in mind the differences in the evaluations.

The INN self-evaluation collected data from students, whereas the independent evaluation relied on self-reported data from parents. There were also differences in the outcome measures: INN used preferences for fruits and vegetables as their outcome measure and the independent evaluation used average daily consumption of fruits and vegetables. Given these differences, it is important to consider the complementary nature of the two evaluations. Comparing the findings of the two evaluations, INN's self-evaluation found that the BASICS Plus intervention led to positive change in student preferences for fruits and vegetables, whereas the BASICS intervention did not. For the independent evaluation, both programs positively affected consumption of fruits and vegetables combined and fruits, whereas an impact on vegetable consumption was limited to the BASICS Plus intervention. Together, these findings suggest that the BASICS and BASICS Plus interventions were effective at encouraging children to eat more fruits and vegetables.

For LEAP2, the self-evaluation and independent evaluations employed different data collection approaches, but both evaluations used consumption of fruits and vegetables as the outcome measure. The LEAP2 evaluation yielded conflicting results based on the two data collection approaches used by UKCES, and the results of the independent evaluation suggest that the program did not affect children's average daily consumption of fruits and vegetables. UKCES plans to modify the program based on the evaluation findings as they move forward with implementing LEAP2.

For ESLS, the self-evaluation and independent evaluation employed different data collection approaches, but both evaluations used consumption of fruits and vegetables as the outcome measure. The independent evaluation found a significant impact on fruit and vegetable consumption (individually and combined). Based on the results of the MSUE evaluation, the ESLS program affected vegetable consumption, but the results for fruit consumption were inconclusive. Together, these findings suggest that the ESLS program is effective at encouraging seniors to eat more fruits and vegetables.

Exhibit VI-6. Summary of Findings From the Self-Evaluations and Comparison With Findings From the Independent Evaluations

BASICS—INN
Findings from self-evaluation: • BASICS Plus intervention led to change in student preferences for fruits and vegetables, while the BASICS intervention did not • Both programs led to an increase in knowledge of benefits of low-fat milk products
Findings from independent evaluation: • Significant impact on combined fruit and vegetable consumption and fruit consumption (BASICS, BASICS Plus) • Significant impact on vegetable consumption (BASICS Plus) • Significant impact on use of 1% or fat-free milk (BASICS Plus) • Significant impacts on variety of fruits (BASICS) and vegetables (BASICS Plus) eaten and willingness to try new fruits (BASICS and BASICS Plus)
LEAP2—UKCES
Findings from self-evaluation: • Intervention students ate more fruits and vegetables than control students based on self-reports from daily calendars • In contrast, the photographic assessment (conducted in subset of schools) did not demonstrate a significant difference between groups in fruit and vegetable consumption
Findings from independent evaluation: • No impact on child's daily at-home consumption of fruits and vegetables (individually or combined) • Secondary impacts limited to household availability of fruits and vegetables
ESLS—MSUE
Findings from self-evaluation: • Significant impact on average daily consumption of vegetables; findings for average daily consumption of fruits was inconclusive
Findings from independent evaluation: • Significant impact on participants' daily consumption of fruits and vegetables (individually and combined)

D. Suggested Improvements for the Self-Evaluations

This section identifies improvements that each IA can make to improve future evaluations, based on the limitations previously identified. The suggested improvements shown in Exhibit VI-7 focus on practical solutions within the resource constraints of SNAP-Ed programs.

Both the INN and UKCES evaluations did not express the outcome measures and research objectives in quantifiable terms or based on relevant evidence-based literature. Accordingly, it is difficult to determine whether their evaluations failed to observe changes in dietary behavior as a function of implementation

failures or because of statistical and measurement issues. The data in the Wave I and Wave II case study reports provide reasonable benchmarks for program effects and can also be used to determine sample sizes for future evaluation work.

To improve future evaluations, INN may want to consider using a data collection instrument that is more sensitive to change. Improvements in recruiting and data collection methods are suggested for UKCES and MSUE to address the limitations previously noted. To address enrollment issues, MSUE should provide additional assistance to those centers and educators that experience difficulties enrolling the required number of participants. UKCES may want to increase training and oversight for data collection and consider an alternative to the daily fruit and vegetable calendar for measuring change in consumption.

The impact analysis conducted by INN did not appropriately take into account the complexity of the evaluation design (clustering of individuals within schools or centers). Statistical programs are now available within most of the standard analytic software packages that can address these issues. Alternatively, post hoc corrections can be applied to test statistics.

Exhibit VI-7. Summary of Suggested Improvements for the Self-Evaluations, by Demonstration Project

Suggested Improvements	BASICS (INN)	LEAP2 (UKCES)	ESLS (MSUE)
Study Design and Measures			
State outcome measures and research objectives in quantifiable terms or based on relevant evidence-based literature	✓	✓	
Instrumentation			
Use instruments that are sensitive to change	✓		
Assess reliability and validity of instruments prior to use or use tested and validated instruments		✓	
Data Collection			
Refine methods use to recruit centers/participants			✓
Refine data collection methods		✓	
Data Analysis			
Match analytic strategies to the characteristics of the evaluation design	✓		

Chapter VII • Discussion and Recommendations

The lessons learned from this evaluation and from the SNAP Education and Evaluation Study, Wave I, can guide FNS in examining the efficacy of proposed SNAP-Ed programs with similar characteristics and features of the seven demonstration projects. This chapter discusses the impact of the three Wave II demonstration projects, aspects of program implementation that were highly successful, and opportunities for improvement. It includes recommendation for future SNAP-Ed programming in school settings and senior centers as well as recommendations for improving SNAP-Ed IA evaluations of their own projects.

A. Key Considerations for School-Based SNAP-Ed Programming

Findings from the process evaluation indicate that, in general, the child-focused demonstration projects were implemented as planned with the following key successes:

- **Intervention site staff members were enthusiastic in their support of the programs.** Overall, the programs were well-received by school principals and classroom teachers at the intervention sites. These key implementation partners reported an appreciation of the high-quality program materials; flexibility of the program staff to accommodate their scheduling needs; and in particular, the relevance of program design, content, and messages. They also indicated that they would welcome the program back at their sites if offered the opportunity in the future. Because of the perceived value of these programs, most school principals and classroom teachers helped support program implementation, and in some cases reinforced nutrition messages with children, which could have influenced some of the observed positive outcomes for the BASICS interventions.
- **Parents and caregivers of child participants expressed high levels of satisfaction.** Parents and caregivers were also very satisfied with the program, citing an appreciation for aspects of each program that paralleled feedback from school principals and classroom teachers. In addition to the quality of program materials and relevancy of the nutrition education messages, parents and caregivers noted the usefulness of suggested at-home activities; satisfaction with parent or caregiver family events in the case of BASICS Plus, and, in general, the programs' support of their effort to help their children be healthy. These program successes are related to the importance of understanding the target audiences through formative research conducted as part of SNAP-Ed program development.
- **Direct educators were well-prepared and found the curriculum easy to implement.** This finding provides some indication that IAs are using staff with the appropriate background, experience, and skill sets to deliver their nutrition education programs; employing effective training programs; or doing both. Moreover, the more prepared direct educators feel, the more likely they are to encourage and maintain buy-in from classroom teachers and school principals, and to influence behavior change among participating children.

These implementation successes suggest that demonstration project planners and implementers understand their target audiences and are dedicated to quality—both of which could serve as best practices for future SNAP-Ed program implementers as they develop their plans for implementation.

Moreover, the impact evaluation findings for BASICS suggest that this SNAP-Ed intervention for children and their parents/caregivers can improve children's nutrition behaviors as described below.

- **The BASICS and BASICS Plus interventions significantly increased children's at-home fruit and vegetable consumption (combined) and fruit consumption.**
- **The BASICS Plus intervention significantly increased children's vegetable consumption and their in-home use of 1 percent or fat-free milk.**

A number of implementation factors identified through the process evaluation might have limited program impacts. These factors are briefly described below:

- **Limited administrative support from some intervention sites.** Although most school principals helped support the demonstration projects' implementation, this was not always the case. At sites with lower levels of administrator engagement, the classroom teachers also exhibited limited engagement in the program.
- **Variability in level of support and reinforcement of program by classroom teachers.** Classroom teacher engagement in the demonstration project lessons and reinforcement of the nutrition education messages was an integral part of the BASICS intervention and to a lesser degree in the LEAP2 program. The incorporation of BASICS supplemental lessons taught in the classroom by the teachers serves to strengthen the reach and dosage of the intervention. This model integrates nutrition education into the curriculum and reinforces the work of the BASICS direct educator. Teachers involved in the LEAP2 program facilitated a daily fruit and vegetable recall calendar with the students. Although some teachers indicated that the fruit and vegetable calendar was useful to help the children think about what they were eating, less than a third of the teachers reported being able to complete the activity every day. This highlights the need to consider competing priorities and demands on teachers' time when designing teacher-facilitated components of program planning.
- **Lower than desired parent engagement.** Both of the child-focused demonstration projects had limited success implementing the parent engagement portion of their programs. Lack of participation or inability to carry out the at-home activities was attributed to time constraints and schedule conflicts. In addition, necessary materials were often not brought home from school. The level of success in parent engagement likely influenced the programs' potential for impact, given that young children's food choices at home are determined by their parents and caregivers.
- **Parents cited food cost as a barrier and perceived that only fresh fruits and vegetables are recommended by the programs.** The barriers most commonly cited by parents and caregivers to achieving the SNAP-Ed program objectives were the cost and time required to find and purchase quality fruits and vegetables, as well as the risk of food spoilage. Several parents and caregivers expressed concern about their very limited food budgets and said that they could not afford to try new recipes with foods that might go to waste if their child would not try them. Focus group discussions revealed that most parents and caregivers perceived that these programs were encouraging them to buy only fresh fruits and vegetables, although a review of the program materials demonstrated that while these programs encourage parents to offer children colorful fresh produce as snacks, several of the materials also include frozen, canned, and dried forms of produce in the take-home recipes.

There were additional constraints placed on the two child-focused demonstrations by their intervention environment, which in many cases affected their planned implementation (e.g., scheduling of classes and events). Nutrition educators in both demonstration projects were constrained by such factors as timing of

when the lessons occurred at the intervention sites, snow days that disrupted the intervention schedule, the demands on the school and children during periods of standardized testing, and the need to modify the timing of the classes around other unanticipated events and schedule changes. However, these constraints are not unique to these demonstration projects nor are they uncommon in school settings; they are simply practical considerations when implementing SNAP-Ed in these settings, and they are important to acknowledge even if they cannot be controlled.

In summary, findings from the impact and process evaluations suggest that more needs to be done to strengthen the carryover of these programs into the home to impact children's daily fruit and vegetable consumption. To this end, it is recommended that program implementers, both current and future, build on the lessons learned through this evaluation and aim to improve child-focused programs in the following ways.

Maximize parent and caregiver reach and engagement. Careful consideration should be given to using multiple methods of direct and indirect education approaches to effectively reach parents and caregivers and help them provide the food and encouragement children need to increase their daily fruit and vegetable consumption.

Encourage greater involvement and support from intervention site staff, including ongoing reinforcement by classroom teachers. SNAP-Ed programs conducted in school settings should establish clear expectations with principals and classroom teachers about what they can do to help implement the program successfully and what the expectations are for teacher engagement during the lessons. Training directed to classroom teachers should highlight the important role they play in the intervention. Teacher training should focus on helping teachers implement simple activities to reinforce SNAP-Ed program messages with the children in their classrooms and enlist their support to ensure that take-home materials go home with the students.

Address food cost issues raised by parents and caregivers by promoting all forms of fruits and vegetables and helping families access nutrition assistance programs, including SNAP and the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC). To more adequately address parent and caregiver concerns about the costs of fruits and vegetables, the lessons and take-home materials should be supplemented with more information on meal planning and shopping on a limited budget. Consistent with the Dietary Guidelines for Americans, SNAP-Ed program materials and direct educators should encourage the use of all forms of fruits and vegetables, including fresh, frozen, canned, and dried (USDA Center for Nutrition Policy and Promotion, 2011). Revisions or additions to the program handouts could be made to include more recipes using lower cost fruits and vegetables.

Conduct needs assessments, and pre-test materials with the target audience. When designing SNAP-Ed program materials, resources should be devoted to conducting formative research to assess the needs of the target population. Needs assessments could include not only focus groups and in-depth interviews with the target audience but use of surveillance data (if available) or surveys to assess the baseline fruit and vegetable consumption in the communities targeted. This information can help determine how to focus the nutrition messages; for example, if baseline consumption of fruits meets the recommendations in the current Dietary Guidelines for Americans, then the education can emphasize increasing vegetable consumption. Needs assessments can also be used to identify the food customs, recipes, and food preparation techniques that are common in the targeted populations and the intervention settings. Before implementing an intervention, resources should be devoted to pre-testing and refining program messages and materials with the target audiences, using such qualitative methods as focus groups and in-depth

interviews. This kind of formative research can help program designers adapt program messages and materials so that they are culturally sensitive to subgroups in the target population, including recent immigrants, people with low literacy, and non-English speakers.

B. Key Considerations Unique to School-Based SNAP-Ed Programming With Social Marketing

Findings from the process evaluation of BASICS Plus indicate that, in general, the social marketing component was implemented as planned with the following successes.

- **Organized, multifaceted approach to social marketing.** The BASICS Plus social marketing component included five major elements: media via television and radio; billboards and bus shelter signage; retail outlet signage and demonstrations; Family Night Out events for parents, caregivers, and children; and school signage. This social marketing campaign supplemented the BASICS curriculum and provided broad coverage of the target audience environment for the delivery of key messages.
- **Strong community partnerships.** The BASICS Plus social marketing campaign required strong partnerships for successful implementation. Partnerships included both public and private partners, and used existing INN partners as well as developed new partners to assist with the planned social marketing campaign. These partners provided access to the SNAP-Ed target audience, assistance in carrying out program elements, and nutrition education that complemented INN messages.
- **Consistent messaging in the classroom and environment.** The aim of the Family Night Out events is to carry BASICS messages from the classroom to parents and caregivers. This event, where both students and their parents and caregivers attend, is designed to reinforce BASICS messages.

Findings from the impact evaluation of BASICS Plus indicate that although the social marketing component of the campaign provided measurable effects related to the use of 1 percent or fat-free milk, there were limited additional measurable effects on fruit and vegetable consumption, compared with the BASICS intervention. There were also implementation factors identified through the process evaluation that might have minimized the intervention's impact on children's consumption of fruits and vegetables. These factors are briefly described below.

Identification of the most effective social marketing delivery method for the most effective target audience reach. Of the five social marketing campaign elements mentioned above, the process evaluation findings provided important insights into which elements of the campaign were seen or heard by parents and caregivers in the environment. Although signage at grocery stores was visible to customers, parents and caregivers in the intervention focus group did not recall seeing the social marketing signage in the six participating retail outlets. Another component of the social marketing campaign, Family Night Out, had limited attendance.

Tracking point-of-purchase signage to ensure that partners followed specified guidelines. The BASIC Plus social marketing campaign included many elements that required tracking during the intervention period, the most difficult of which was tracking signage in retail outlets. Although stores were committed to the social marketing campaign, their regular protocols took precedence over the campaign. Floor cleaning or holiday decorations that removed or covered some campaign floor slicks (messaging on clear plastic applied to the floor) resulting in reduced campaign messaging in stores.

Determining the most effective social marketing campaign delivery channels. The process evaluation findings assessed the most effective channels for reaching parents and caregivers with BASICS nutrition messages. Prioritizing these social marketing message channels, and focusing on the most effective channels will allow INN to strategically expend SNAP-Ed funding for social marketing while reaching the target audience in the most effective way.

C. Key Considerations for Senior Center–Based Programming

Findings from the process evaluation indicate that, in general, the ESLS program was implemented with a number of successes as described below. Moreover, the impact evaluation findings for ESLS suggest that this SNAP-Ed intervention can increase older adults' fruit and vegetable consumption.

- **Nutrition education content was relevant for and well-received by the target audience.** Similar to the child-focused demonstrations, the ESLS nutrition education content was well-received by the intended target audience. Participant reports of a high degree of satisfaction with the nutrition education messages and content of the program clearly show that the ESLS program development team[17] had a good understanding of their target audiences' interests and needs. In addition to being satisfied with the program's nutrition education content and activities, the participant follow-up survey revealed that program participants were also satisfied with the amount of time it took to complete the course.
- **The program was accessible and easy to attend for most participants.** Observation of ESLS and focus group input from ESLS participants provided positive feedback about program accessibility. For the majority of participants, ESLS lessons were taught in a senior center where the participant lived or visited or, if in a rural area, was close enough to participants' homes to enable them to attend sessions. In rural areas, such as the Upper Peninsula of Michigan, participants expect to drive greater distances to grocery shop, attend events, or go to a senior center for lunch or programming and thus are used to driving distances for activities.
- **Direct educators were well-prepared and found the curriculum easy to implement**. This finding provides some indication that MSUE was using staff with the appropriate background, experience, and skill sets to deliver ESLS, employing effective training programs, or doing both. Moreover, the more prepared direct educators feel, the more likely they are to encourage and maintain buy-in from senior center staff and to influence behavior change among program participants.

Several areas of improvement for MSUE's implementation of ESLS are described below.

Emphasis on the use of a variety of forms of fruits and vegetables. Although the ESLS curriculum promotes the consumption of a variety of forms of fruits and vegetables, the process evaluation found that many participants think primarily of increasing consumption of fresh fruits and vegetables. Strengthening the focus on using fruits and vegetables in a variety of forms may help seniors find new and less expensive ways to incorporate these foods into their diet.

Strengthen partnerships with senior centers and other venues that provide services to seniors. The process evaluation findings reveal that a strong partnership with senior centers can facilitate recruitment of the target audience for the ESLS program. This partnership is vital to the successful implementation of

[17] USDA Food and Nutrition Service. *Eat Smart, Live Strong program*. Retrieved from http://snap.nal.usda.gov/resource-library/nutrition-education-materials-fns/eat-smart-live-strong.

the program. When senior centers are committed to the program and committed to the process of identifying and recruiting participants, it saves time for the direct educator and allows them to reach their target audience goals.

D. Key Considerations for SNAP-Ed Evaluations

SNAP-Ed Guiding Principles call for SNAP-Ed programs that are evidence-based and behaviorally focused. Moreover, FNS expects that States "demonstrate through research review or sound, self-initiated evaluation, if needed, that interventions have been tested and demonstrated to be meaningful for their specific target audience(s), implemented as intended or modified with justification, and shown to have the intended impact on behavior" (USDA, 2013). Although FNS guidelines encourage all States to evaluate the effectiveness of their SNAP-Ed programs, measuring and identifying the results of nutrition education in terms of measurable changes to dietary behaviors are challenges for both FNS and its State and local partners.

The assessment of the IA's self-evaluations considered the rigor of the self-evaluations and identified strengths, limitations, and areas for improvement. As discussed in Chapter VI, the quality of the self-evaluations varied. Generally, the self-evaluations were technically sound and demonstrated most of the characteristics of a rigorous evaluation and should be replicated with the improvements noted.

Principles of Impact Evaluation

1. Make certain that the nutrition education intervention can be evaluated.
2. Build on available research.
3. Hold out for research designs with random assignment but use them selectively.
4. Choose impact measures that fit the intervention and that approach existing standards for credible assessment.
5. Observe standards for the fair treatment of study participants.
6. Collect impact data after startup problems get resolved but before implementation rolls out.
7. Report both positive and negative results, but do so accurately.
8. Share results to maximize their value.

Source: U.S. Department of Agriculture, Food and Nutrition Service. (2005). *Nutrition education: Principles of sound impact evaluation.*

The document, "Nutrition Education: Principles of Sound Impact Evaluation" (USDA, 2005), provides SNAP-Ed IAs with guidance for conducting a sound impact evaluation (see sidebar). Given the range of available evaluation methodologies, the challenge to the evaluator is to choose a design that eliminates alternative explanations of program effects and establishes causality between the intervention and the dietary behavioral outcomes, within the resource constraints of the IA. As previously noted, the 2006 Food Stamp Nutrition Education systems review revealed that, for some IAs, the lack of funds and expertise on the part of local project staff and subcontractors is a barrier to conducting rigorous impact evaluations. Thus, if feasible, some IAs may need to secure additional funding (e.g., joint State funding or grant funding) or partner with evaluators or statisticians at a local university to conduct a rigorous impact evaluation.

Based on the assessment of the Wave II self-evaluations and the assessment conducted for Wave I (USDA, 2012), as well as considering the types of resources and staff typically available to SNAP-Ed IAs, the following recommendations are offered for improving the impact evaluations conducted by SNAP-Ed IAs.

Determine the anticipated size of the program impact on the target audience before conducting the intervention. When resources are constrained, evaluators can examine the published literature, especially

meta-analyses, and assess the magnitude of impact for programs similar to the intervention under consideration.

Use a comparison or control group and, to the extent possible, randomly assign units to either the treatment or comparison/control group. If random assignment is not possible, then a quasi-experimental design is acceptable. If a control or comparison group is not a feasible option, consider an interrupted time-series analysis.

Conduct a power analysis to determine the minimum sample size needed for the evaluation study. This will help ensure that the sample size is large enough to detect the desired level of change.

Use existing survey instruments that are demonstrated to be valid and reliable and are sensitive to change. If developing new instruments or measurement tools, conduct pretesting to demonstrate adequate psychometric properties (validity and reliability) of the measures.

Establish standardized procedures for data collection and quality control. The use of standard protocols and training will help ensure consistency and quality data for the impact analysis.

Match the analytic strategies to the characteristics of the evaluation design. For studies that include the clustering of individuals within schools or centers, the analysis needs to account for the complexities of the evaluation design. Statistical programs are now available within most of the standard analytic software packages that can address these designs. Alternatively, post hoc corrections can be applied to test statistics.

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Appendix A
Evaluation Designs for the FNS Independent Evaluations

Exhibit A-1.— Evaluation Design for the Independent Evaluation of the BASICS Program, INN

Characteristic	Description
Study population	Parents and caregivers of third-grade students attending eligible schools in four Iowa school districts (including comparison).
Evaluation design and sample selection	Quasi-experimental research design with 11 single-channel intervention schools (school-based BASICS curriculum), 11 multichannel intervention schools (school-based BASICS curriculum and social marketing campaign), and 11 comparison schools.
Required sample size	Complete baseline and follow-up data from 242 parents or caregivers in each treatment condition.
Data collection procedures	Surveyed parents and caregivers pre- and post-intervention using a mail survey; nonrespondents were contacted and the survey was administered by telephone.
Survey response	1,049 respondents at baseline (83 percent response rate among those agreeing to participate in study) and 806 respondents (77 percent response rate) at follow-up.
Data analysis	Mixed model regressions using maximum likelihood estimation.

Exhibit A-2.— Evaluation Design for the Independent Evaluation of the LEAP2 Program, UKCES

Characteristic	Description
Study population	Parents and caregivers of first, second, and third grade students attending schools in Laurel and Perry Counties, Kentucky.
Evaluation design and sample selection	Experimental research design in which schools were matched and random assignment made to the intervention (n = 8) or control group (n = 8).
Required sample size	Complete baseline and follow-up data from 640 respondents.
Data collection procedures	Surveyed parents and caregivers pre- and post-intervention using a mail survey; nonrespondents were contacted and the survey was administered by telephone.
Survey response	907 respondents at baseline (77 percent response rate among those agreeing to participate in study) and 768 respondents at follow-up (85 percent response rate).
Data analysis	Mixed model regressions using maximum likelihood estimation.

Exhibit A-3.— Evaluation Design for the Independent Evaluation of the ESLS Program, MSUE

Characteristic	Description
Study population	People aged 60–80 years old attending senior centers in selected counties in Michigan who met the study eligibility criteria.
Evaluation design and sample selection	Quasi-experimental research design with 17 intervention centers and 16 comparison centers.
Required sample size	Complete baseline and follow-up data from 510 respondents.
Data collection procedures	Pre-intervention surveys administered in person concurrent with MSUE survey administration. Post-intervention surveys were mailed; nonrespondents were contacted and the survey was administered by telephone.
Survey response (among age eligible respondents)	614 respondents at baseline and 603 respondents at follow-up (98 percent response rate).
Data analysis	Mixed model regressions using maximum likelihood estimation.

Appendix B
Summary of Instruments Used to Develop Impact Instruments for the FNS Independent Evaluations

Exhibit B-1.— Summary of Instruments Used to Develop Impact Instruments for the FNS Independent Evaluations

Outcome Measures	Instrument	Study Population(s)	Mode(s) of Data Collection	Reliability	Validity	Sensitivity to Change
Cups of fruits, vegetables, and fruits and vegetables consumed each day Ate variety of fruits each day Ate variety of vegetables each day	Food Stamp Program Fruit and Vegetable Checklist (Townsend et al., 2003) University of California Cooperative Extension Food Behavior Checklist (Townsend et al., 2008)	Low-income women	Self-administered, self-administered in group setting, and interviewer-administered individually and in groups	The internal consistency for the 7-item fruit and vegetable subscale was high (α = 0.80)	The 7-item fruit and vegetable subscale showed a significant correlation with serum carotenoid values (r = 0.44, $p < 0.001$), indicating acceptable criterion validity, and showed significant correlation with dietary variables	Demonstrated sensitivity to change for items expected to change as a result of the study intervention
Used 1% or fat-free milk	NHANES 2005–2006 (CDC, 2007)	General population	Interviewer administered	Not reported	Not reported	Not reported
Willingness to try new fruits Willingness to try new vegetables	Willingness to try new fruits and vegetables (Jamelske, Bica, McCarty, & Meinen, 2008)	4th, 7th, and 9th graders	Self-administered	Not reported	Not reported	Compared with controls, intervention participants reported an increased willingness to try new fruits and vegetables at school ($p < 0.01$)

Outcome Measures	Instrument	Study Population(s)	Mode(s) of Data Collection	Reliability	Validity	Sensitivity to Change
Availability of fruits and vegetables at home during past week	Fruit, juice, and vegetable availability questionnaire (Marsh, Cullen, & Baranowski, 2003; Cullen et al., 2003)	Parents of 4th and 6th graders	Self-administered and interviewer administered via telephone	The internal consistencies for the fruit and vegetable availability items were high	There was significant agreement between self-reported and observed at-home availability for all fruit juices and most fruits and vegetables	Fruit, juice, and vegetable availability was a significant predictor of child fruit, juice, and vegetable consumption ($p < 0.05$)
Attitudes toward accessibility and affordability of fruits and vegetables	Broadland Housing Questionnaire (Dibsdall, 2003)	Low-income adults	Self-administered	The internal consistencies for the 10-item choice and 5-item affordability subscales were high ($\alpha = 0.87$ and $\alpha = 0.85$)	Not reported	Not reported