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Supplemental Nutrition Assistance Program

***SNAP Education and Evaluation
Case Study Report:***

*Chickasaw Nation Nutrition Services'
Eagle Adventure Program*

Volume I: Report



United States
Department of
Agriculture

Food and
Nutrition
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SNAP Education and Evaluation Case Study Report:

Chickasaw Nation Nutrition Services' Eagle Adventure Program

Volume I: Report

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Executive Summary

This executive summary presents the background, methods and highlights key findings from one of four case study reports produced for the *Models of SNAP Education and Evaluation, Wave I*. This report is specific to the evaluation of Eagle Adventure, the Chickasaw Nation Nutrition Services' (CNNS) Supplemental Nutrition Assistance Program-Education (SNAP-Ed) demonstration project. The evaluation, which was sponsored by the Food and Nutrition Service (FNS) of the U.S. Department of Agriculture (USDA), 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 CNNS' own evaluation of its program.

The Eagle Adventure program, which targets children in the first through third grades, was tailored to the specific nutrition and health concerns of SNAP-Ed-eligible Native American families living in the Chickasaw Nation boundaries. The program is primarily delivered in a school setting and aims to increase children's knowledge and consumption of fruits and vegetables and balance caloric intake with energy expenditure through increased physical activity. However, the focus of the FNS evaluation was on changes in at-home fruit and vegetable consumption.

Based on models describing changes over time between the intervention and comparison groups, there is no indication that the Eagle Adventure program had a statistically significant impact on children's average daily at-home consumption of fruits and vegetables based on parental reports. On the other hand, compared to parents in the comparison group, parents in the intervention group reported an increase in the number of days per week that their children helped themselves or asked for vegetables as a snack, resulting in a statistically significant increase in child-initiated vegetable snacking, which if sustained may lead to increased vegetable consumption.

The process evaluation revealed a high degree of satisfaction with the program by principals, parents, and caregivers. These stakeholders, as well as program staff members, attribute this to the relevance of the nutrition education messages and the quality of the program materials and to the caliber of the nutrition education providers. The process evaluation revealed several challenges related to implementation and opportunities for improvement. Most notable, perhaps, is the need to enhance methods used to reach and engage parents and caregivers in the Eagle Adventure activities.

A. Background on SNAP-Ed

Under subcontract agreements with State SNAP agencies, a variety of organizations partner to implement SNAP-Ed within States. The goal of these programs is to improve the likelihood that SNAP participants and persons eligible for SNAP nutrition assistance will make healthy food choices within a limited budget and choose physically active lifestyles. FNS' SNAP-Ed Guiding Principles call for interventions that are science-based and behaviorally focused. FNS also requests that States' SNAP-Ed efforts be consistent with the current (2010) Dietary Guidelines for Americans, including the following¹:

- Eat fruits and vegetables, whole grains, and fat-free or low-fat milk products every day;
- Be physically active every day as part of a healthy lifestyle; and

¹ See SNAP-Ed Plan Guidance at: <http://www.nal.usda.gov/fsn/Guidance/FY2012SNAP-EdGuidance.pdf> and SNAP-Ed Connections website at: <http://snap.nal.usda.gov>

- Balance caloric intake from food and beverages with calories expended.

SNAP-Ed Guidance also encourages all States 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 implementing agencies (IA) reported that they did conduct 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 process outcomes, such as program use, than they were on participant behavior change (FNS, 2006). 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.

This study, *Models of SNAP Education and Evaluation (Wave I)*, is the first of two FNS-initiated independent evaluations designed to identify potential models of effective SNAP-Ed nutrition education and impact 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 affecting the nutrition and health behaviors of SNAP clients 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 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. In early 2009, an FNS study review committee competitively selected four SNAP-Ed IAs to participate in this study, including CNNS' Eagle Adventure program. Each of the four agencies implemented their demonstration programs between March and August of FY 2010 and conducted their own evaluations.

B. Overview of the Eagle Adventure Program

The goal of the Eagle Adventure program, which is one of several components of CNNS' multifaceted *Get Fresh!* SNAP-Ed program, is to prevent diabetes in Native American families using a culturally appropriate intervention strategy aimed at children and delivered through schools. The nutrition education messages and materials build upon a "type 2" diabetes prevention program developed by the Centers for Disease Control and Prevention (CDC)'s Division of Diabetes Translation's Native Diabetes Wellness Program, the Tribal Leaders Diabetes Committee, and the Indian Health Service. CNNS developed the Eagle Adventure curriculum based upon the CDC Eagle Books and used the opportunity of the FNS-funded *Models of SNAP Education and Evaluation* project to implement their approach. Eagle Adventure encourages children to increase consumption of fruits and vegetables and to balance calorie intake with energy expenditure through increased physical activity. The program is primarily directed at elementary (first- through third-grade) school-age children and aims to address six objectives that include increasing the following:

- Intent to choose fruits and vegetables,
- Consumption of fruits and vegetables,

- Knowledge of fruits and vegetables as healthful snack options,
- Intent to participate in physical activities,
- Physical activity behaviors, and
- Knowledge of healthful physical activities.

Using the social ecological model as a framework and the Eagle Books as a central construct, CNNS developed a four-act play, four classroom lessons, and numerous take-home nutrition education materials to ensure that individual (grade-school children), interpersonal (parents and caregivers), and organizational (the school environment via posters and announcements) levels of influence were incorporated. Program developers noted that two studies—Perry (2002) and Jackson (2004), both of which tested the effectiveness of using theater as an educational strategy for communicating nutrition messages to school-age youth—were instrumental in their decision to develop and include a dramatic play as a channel of message delivery. The program includes four modes of education delivery (see figure ES-1).

Figure ES-1. — Eagle Adventure Program Components

- ▲ **A play.** The Eagle Adventure intervention was kicked off in each of the schools with a four-act play. This play brought the four Eagle Books to life through the use of culturally appropriate characters and aimed to alter social norms through positive behavior modeling. The play was also intended to help capture the attention of children and build interest in the program prior to implementing direct education in the classrooms.
- ▲ **Four direct education lessons delivered in the classroom setting.** Following the play, four 40-minute nutrition education lessons were administered in the intervention classrooms, with the lessons corresponding to and reinforcing messages from each of the four Eagle Books.
- ▲ **Indirect education provided through take-home materials and activities.** CNNS offered indirect education to reinforce key nutrition education messages by providing take-home materials (e.g., Eagle Books, healthy recipes, and parent tip sheets with ideas for age-appropriate activities for their children) and homework assignments called “Nestwork” for parents and caregivers to complete with their children.
- ▲ **Indirect education provided in the school environment.** CNNS also offered indirect education in the form of a banner that was displayed outside the school and posters displayed inside the school in hallways and cafeterias. Additionally, CNNS asked school principals or other administrators to read a series of brief announcements called Eagle Tips over the school intercom as part of morning announcements. Eagle Tips included nutrition-focused messages that were consistent with the four Eagle Adventure lessons. The posters and announcements, which were developed by the Eagle Adventure team using images from the Eagle Books, were intended to promote positive reinforcement of healthful behaviors in the school environment.

C. Study Methodology

1. Evaluation Design

The Eagle Adventure program evaluation was designed to examine the implementation and impact of the program on children in the first, second, and third grades in schools in Pontotoc County, Oklahoma. The independent evaluators requested that CNNS provide the intervention to schools in another county to increase the number of schools available for the evaluation. Due to resource and staffing constraints, CNNS was unable to provide the intervention to schools outside of Pontotoc County. To provide the most rigorous design possible under this constraint, the evaluation used a quasi-experimental design with

Bryan County, a neighboring county with similar percentages of Native American students and students receiving free and reduced-priced meals, for selection of comparison schools. Schools in Pontotoc County were matched to schools in Bryan County on percentage of Native American students, percentage of students receiving free and reduced-priced meals, and school size. Five schools in Pontotoc County received the Eagle Adventure program and were included in both the impact and process evaluations. The comparison group, five schools in Bryan County, did not receive the intervention.

2. Process Evaluation Methods

The Eagle Adventure process evaluation began by creating a baseline description of the objectives, approach, and components of the design, administration, and implementation of the program. This information was obtained from interviews with program-level staff members and from secondary documents.² Once the intervention was implemented, the collection and analysis of information on factors influencing the implementation and the lessons learned for program improvement and replicability began. This information was gained from in-person and telephone interviews with program-level staff, educators who implemented Eagle Adventure, and school principals. To supplement the interviews, onsite observations of direct education at two schools were conducted to assess how well direct educators followed the curriculum and to document any environmental factors that may have supported or impeded program implementation. Key informant responses to each interview or questionnaire item 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 facilitators and challenges) and specific topics (e.g., lesson plan scheduling) as well as agreement and disagreement amongst respondents.

Another important component of the process evaluation was the assessment of the experience and satisfaction of the parents and caregivers with the intervention. Information was collected on factors such as program accessibility for parents and caregivers, perceived goals of the program, how the program helped them change their children's nutrition behaviors, and potential barriers faced in trying to increase their fruit and vegetable intake. These data were collected through a post-intervention parent survey and focus groups with a subset of parents and caregivers who responded to the survey.

Program administrative data were used to assess the project's reach and the amount of exposure that children had to the Eagle Adventure intervention. The process evaluation also describes the resources and costs CNNS reported for implementation and evaluation of the About Eating demonstration program. Based upon the implementation costs and reach data, the study also estimates the program's cost per child participant.

The analysis approach for the process evaluation was primarily qualitative, encompassing the triangulation of information collected from secondary data sources, interviews with key informants, and parent and caregiver focus groups. Quantitative analysis was conducted on program reach, dosage, cost, and the parent follow-up survey responses.

² Documents included CNNS' application to FNS for this study, CNNS program reports, and the Eagle Adventure curriculum.

3. Impact Evaluation Methods

To better understand the factors affecting behavioral change, the analysis included an examination of potential program effects. The framework shown in figure ES-2 enables the evaluation of the effects of the Eagle Adventure program through the specification of secondary outcomes that link the intervention to the long-term outcome of the child's average daily at-home consumption of fruits and vegetables. The secondary outcomes capture, in greater detail, 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 change in fruit and vegetable consumption.

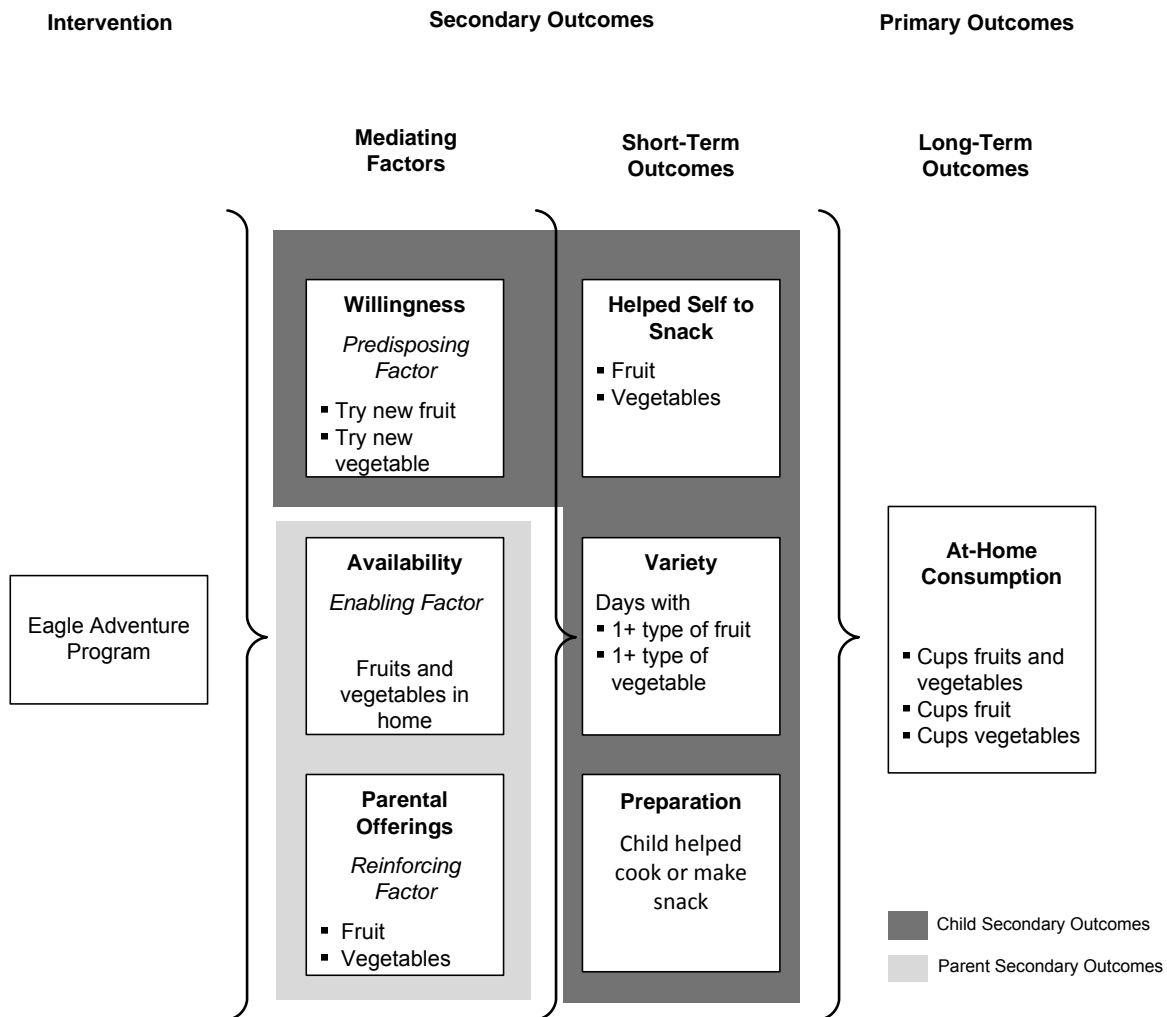
The independent evaluators assessed the impact of the program on the primary outcome measure of the child's average daily at-home consumption of fruits and vegetables. Based on FNS's interest in observing a minimum increase in children's dietary intake of 0.30 standard deviation units it was hypothesized that children participating in the program would increase their average daily at-home consumption of fruits and vegetables by approximately 0.30 cups per day compared with children not participating in the program.

The impact analysis considered the following secondary outcome measures:

- ▲ Variety—eat more than one type of fruit or vegetable each day,
- ▲ Snacking—help oneself to or request a fruit or vegetable as a snack,
- ▲ Preparation—help parent make snacks or meals,
- ▲ Willingness—willingness to try new fruits and vegetables,
- ▲ Availability—average weekly at-home availability of fruits and vegetables, and
- ▲ Parental offerings—frequency of parental offerings of fruits or vegetables as a snack and at dinner.

Using a mail and telephone survey approach, parents and caregivers were surveyed at baseline and follow-up to collect information on the child's consumption and other dietary behaviors. The combined consent and response rate for the baseline survey was 58 percent for the intervention group and 53 percent for the comparison group. The response rate for the follow-up survey was 84 percent for the intervention group and 85 percent for the comparison group. The potential impact of attrition from the evaluation study on generalizability was assessed by comparing the pre-intervention similarity of study participants who provided follow-up data and those who did not. The two groups differed with regard to respondent age and household size.

Figure ES-2.— Conceptual Framework for the Eagle Adventure Program Impact Evaluation



Source: Adapted from 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.

General linear mixed models (continuous impact variables) and generalized linear mixed models (dichotomous impact variables) were used to evaluate the impact of the program while accounting for the clustering of children within schools. 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. Covariates in the model included child age, child sex, household size, whether a household had only one adult, respondent race and ethnicity, respondent age, and respondent sex.

4. Methods for the Assessment of CNNS' Self-Evaluation

This study also examined the soundness of CNNS' self-evaluation. This assessment included a detailed description of CNNS' evaluation methodology, including the management, staffing, and costs of the evaluation; an assessment of the quality of CNNS' evaluation, including an identification of strengths,

weaknesses, and areas of improvement; and a comparison of CNNS' evaluation results with those of the independent impact evaluation.

D. Process Evaluation Findings

During the intervention period, a total of 37 first- through third-grade classrooms across five schools in Pontotoc County, Oklahoma, received the Eagle Adventure program. Based on classroom rosters approximately 2 months prior to implementation, the program had the potential to reach 714 children and 800–1,000 parents and caregivers. These figures also represent the best estimates of actual program reach since nutrition education participants were not tracked at the individual level. Based on this potential reach, it cost approximately \$92.09 per participant to implement the Eagle Adventure program. Analysis of the Eagle Adventure program data also shows that on average, children in the intervention classrooms received a total of 145 minutes of nutrition education through the Eagle Adventure program (120 minutes in their classrooms and 25 minutes while watching the play).

1. Key Informant Perspectives on Program Implementation

Overall, program managers, direct educators, and principals involved with the Eagle Adventure demonstration project reported that many factors in the program's design make it a most relevant and enjoyable program to implement with the selected target audience. Furthermore, the flexibility and passion of the Eagle Adventure team members, as well as their devotion to quality and their in-depth understanding of the target audience, were instrumental in gaining school cooperation and ensuring satisfaction with the program. The most commonly reported facilitators to program implementation were the relevance of nutrition education messages, repetition of messages at multiple levels of influence (direct education, take-home materials, displays at the school, and the play), and the use of high-quality materials and staff.

At the same time, interviews with the program implementers and nutrition education observations also identified several critical challenges to implementing this program in schools. The most commonly reported barriers to program implementation were reaching and engaging parents of program participants, implementation timeframe (e.g., competing priorities in the spring semester, short implementation period), and varying levels of teacher engagement during the lessons.

2. Caregiver Satisfaction and Use of Program Materials

Caregiver survey results and focus group discussions revealed a relatively high level of use and satisfaction with the program materials. When parents and caregivers who responded to the post-intervention survey were asked how many Eagle Books they had read to their children, more than 46 percent reported reading all four, an additional 18 percent reported reading three, and only 5 percent did not read any. When asked about their use of other take-home materials, nearly 71 percent of parents and caregivers reported using at least one recipe to prepare a snack or meal for their children and more than 80 percent completed one or more "Nestwork" with their children. Moreover, although not specifically cited during focus groups as a facilitator or promoter of parent and caregiver engagement in the activities, when asked via the post-intervention survey about their level of understanding of the Eagle Adventure program materials, 95 percent of parents and caregivers reported that the materials were easy or very easy to understand.

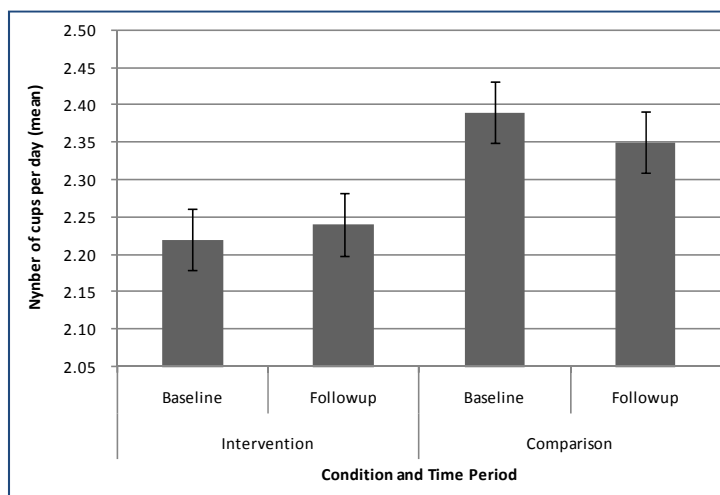
E. Impact Evaluation Findings

1. Primary Impact Results

The baseline analysis included 856 parent respondents, with 411 in the intervention group (parents of children attending five schools in Pontotoc County) and 445 in the comparison group (parents of children attending five schools in Bryan County). At baseline, children in the intervention and comparison groups were similar. The characteristics of parent respondents and their households were similar for the intervention and comparison groups with the exception of age. This difference was controlled for by including age, as well as other demographic characteristics, as covariates in the impact models. At baseline, there were no statistically significant differences between the intervention group and the comparison group for any of the primary or secondary outcome measures.

Based on models describing changes over time between the intervention and comparison groups, there is no indication that the Eagle Adventure program had a statistically significant impact on children’s average daily at-home consumption of fruits and vegetables (see figure ES-3). Between baseline and follow-up, there was a small increase in consumption of fruits and vegetables among children exposed to the program and for the comparison group there was a small decrease in consumption of fruits and vegetables. The overall impact of 0.07 cups of fruits and vegetables was below the anticipated minimum detectable difference of 0.30 cups. The lack of a statistically significant finding may have been influenced by ceiling effects that limited the ability to detect significant change. As reported by parents, children’s daily fruit and vegetable consumption in the home at baseline was quite close to USDA’s Food Guidance System recommendations for this age group (2.25 cups for the intervention group and 2.38 cups for the comparison group).³ Alternatively, parents or caregivers may have expressed an upward bias (e.g., social desirability) in reporting their children’s diet. Either of these would have limited the ability to observe change.

Figure ES-3.— Changes in Daily At-Home Consumption of Fruits and Vegetables ($p = 0.5599$)



³ According to USDA’s Food Guidance System, it is recommended that children aged 2 to 5 years eat about 1 to 2 cups of vegetables each day and 1 to 1.5 cups of fruit each day, depending on the child’s gender and activity level (USDA, 2011).

2. Secondary Impact Results

There was one statistically significant difference and two trends (differences approaching statistical significance) in children’s behaviors and intentions as well as in the household environment. As shown in figure ES-4, compared to parents in the comparison group, parents in the intervention group reported an increase in the number of days per week that their children helped themselves to or asked for vegetables as a snack. This resulted in a statistically significant increase in the rate of child-initiated vegetable snacking ($p = 0.0441$).

The results indicate an upward trend such that children in the intervention group expressed greater willingness than children in the comparison group to try new vegetables ($p = 0.0925$) (see figure ES-5). Finally, the results indicate a trend ($p = 0.0771$) toward increased availability of fruits and vegetables in the homes of children who participated in the Eagle Adventure program (see figure ES-6).

Figure ES-4.— EWPHCCS Impact Evaluation—Changes in Children Asking or Helping Themselves to Vegetables as a Snack ($p = 0.0146$)

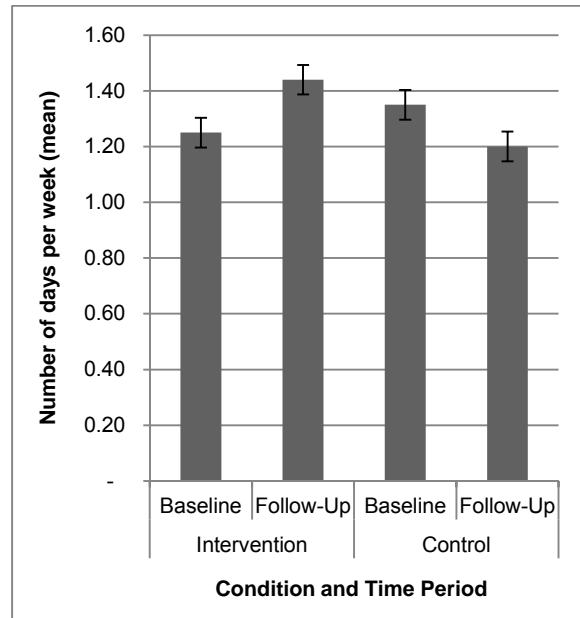


Figure ES-5. — Changes in Children’s Willingness to Try New Vegetables ($p = 0.0925$)

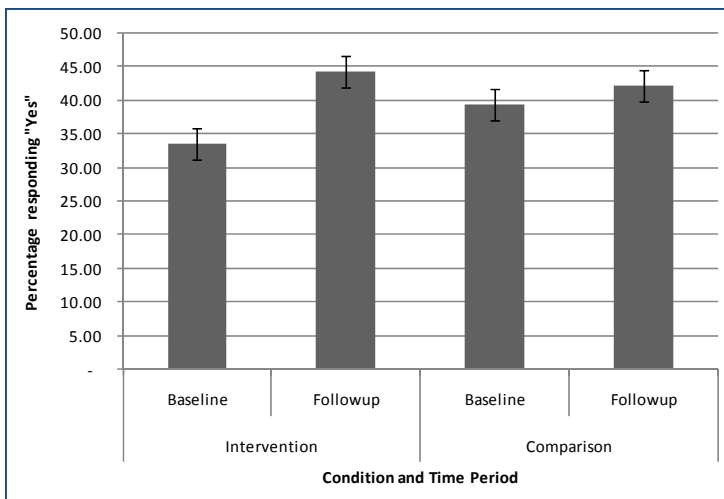
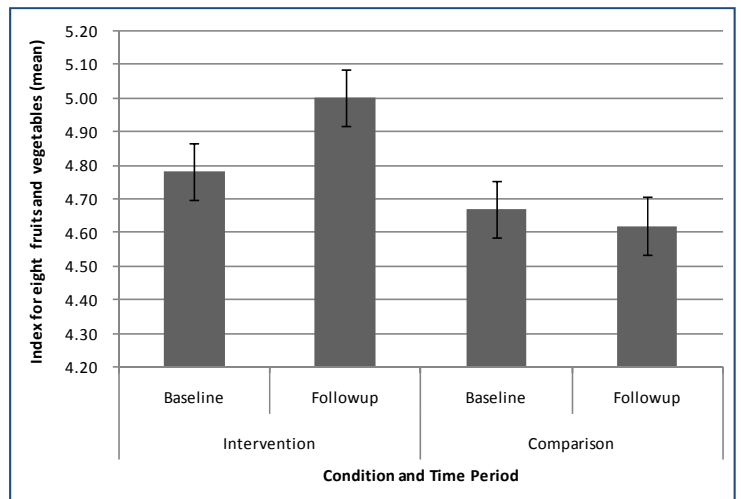


Figure ES-6. — Changes in Availability of Fruits and Vegetables in the Home ($p = 0.0771$)



F. Findings From the Assessment of CNNS' Self-Evaluation

The CNNS evaluation employed a one-group pre-post test design with surveys of students participating in the intervention to measure the impact of the Eagle Adventure program. Strengths of the evaluation included the sound data collection methodology, limited participant attrition, and few missing data for the impact analysis. Weaknesses included a poor comparison strategy, an inadequate sampling approach, and the data analyses did not account for the clustering of students within schools. The CNNS self-evaluation found that children who received the Eagle Adventure program improved on a scale of healthy food choices. These findings are encouraging, although the absence of a comparison group makes it difficult to interpret the cause of these changes.

Based on lessons learned through their evaluation of the Eagle Adventure program, CNNS will continue to improve upon its current evaluation methods. It may include a qualitative component to learn more about participant satisfaction with the program and add a brief parent and caregiver survey to increase their understanding of child's nutrition-related behavior at home. Moreover, CNNS will maintain those aspects of their evaluation process that worked well (e.g., data collector training, the outcomes coordinator's involvement in program implementation planning) and try to limit the amount of class time spent on evaluation, rather than on nutrition education, without compromising the quality of their evaluation.

G. Recommendations

Based on the findings from the independent evaluation, the Eagle Adventure intervention did not result in a measurable increase in daily at-home consumption of fruits and vegetables. However, there was a significant increase in children asking or helping themselves to vegetables for a snack and upward trends for children's willingness to try new vegetables and at-home availability of fruits and vegetables. Additionally, program staff, direct educators, and school administrators reported that Eagle Adventure program implementation went very well and was relatively easy and straightforward while parents and caregivers of children receiving the intervention reported relatively high use of program take-home materials and expressed satisfaction with the program overall. For these reasons, with the improvements described below, the Eagle Adventure program could serve as a potentially promising example of SNAP nutrition education, particularly in areas with a strong Native American influence.

▲ Key Areas for Program Improvement

Overall, input from program staff, parents, and caregivers suggests that revisions are needed to make this intervention more accessible to low-resource families and to the diverse population of children, parents, and caregivers whom it seeks to serve. The following specific suggestions were offered by these stakeholder groups:

- **Enhance program visibility among parents and caregivers.** To enhance program visibility, Eagle Adventure staff suggested a concurrent social marketing campaign, while parents and caregivers suggested increased communication from the school about the program as well as recipes shared via the Web.
- **Maximize participation of parents and caregivers in the program.** Principals suggested avoiding implementation during standardized testing periods. Parents and caregivers suggested increasing time between lessons and avoiding times of the year when parents and children are busy with other activities (e.g., spring).
- **Encourage greater involvement and support from classroom teachers.** In an effort to promote teachers' reinforcement of the nutrition education messages, and in turn, reduce children's receipt

of mixed messages in the school environment, the CNNS SNAP-Ed program team should consider increasing teachers' engagement in the Eagle Adventure program or including teachers as a target audience of the intervention.

- **Address cost concerns raised by parents and caregivers.** To more adequately address parent and caregiver concerns about the cost and time constraints related to shopping for and preparing healthy foods on a budget, the evaluators suggest that the Eagle Adventure team consider adding a parent tip sheet on this topic or providing in-store demonstrations or healthy food tastings. Consistent with the current (2010) Dietary Guidelines for Americans, the curriculum should encourage the use of all forms of fruits and vegetables, including fresh, frozen, canned, and dried (USDA, CNRP 2011). Revisions or additions to the program handouts could be made to include more recipes using the same fruits or vegetables. Additionally, the program should provide parents and caregivers informational materials to help them access food assistance programs they may be eligible for including SNAP, WIC, and emergency food programs.

Some of these suggested program improvements would require additional resources and may not be feasible for CNNS to implement. However, adopting one or more of these recommendations could improve program implementation and give the Eagle Adventure program an increased potential to impact behavior change.

▲ **Suggestions for Improving Evaluations**

As the team at CNNS continues to refine and implement the Eagle Adventure program, and as it considers future evaluations, it is suggested that they use an evaluation design that can reduce plausible alternative explanations of program impact. The following specific improvements are suggested:

- If resources permit, include a control or comparison group; however, if this is not feasible an alternative approach would be to conduct several rounds of data collection pre- and post-intervention for interrupted time series analyses.
- Determine the anticipated size of the program impact on the target audience before conducting the intervention.
- Match the analytic strategies to the characteristics of the evaluation design (i.e., account for the clustering of children within schools).

These changes would improve the quality of the evaluation and increase CNNS' ability to accurately measure changes attributable to the program.

Chapter I • Introduction

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 nutrition assistance will make healthy food choices within a limited budget and choose physically active lifestyles consistent with the current (2010) Dietary Guidelines for Americans (USDA, CNPP, 2011).

The Food and Nutrition Service's (FNS) official SNAP-Ed Guidance not only provides information to help States in designing and implementing SNAP-Ed programs, but also specifically encourages States to evaluate the effectiveness of their SNAP-Ed programs.⁴ In 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 participant behavior change (FNS, 2006). 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 nutrition education meets FNS' goals.

This study, *Models of SNAP Education and Evaluation (Wave I)*, is the first of two FNS-initiated independent evaluations designed to identify models of effective SNAP-Ed nutrition education and models for SNAP-Ed impact evaluation. The overarching goal of this evaluation is to determine whether the selected projects can serve as good examples of SNAP-Ed delivery 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 implementing agencies, and
- Providing methodologically robust yet logistically practical examples of project-level SNAP-Ed evaluation efforts.

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

⁴ <http://www.nal.usda.gov/fsn/Guidance/FY2012SNAP-EdGuidance.pdf>

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 (where relevant) 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 primary nutrition behavioral outcomes (i.e., cups of fruits and vegetables consumed)?
- What was the intervention's impact on secondary outcomes (i.e., 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 its ideal planned evaluation?
- What were the resources needed and costs of the evaluation?
- What were the results of the self-evaluation, and how do these compare with the independent impact evaluation?
- What were the lessons learned?

A. Selection of Wave I Demonstration Projects

In FY 2008, FNS issued a request for applications to states to propose models SNAP-Education and evaluation and participate in the FNS-funded independent evaluation. Applicants proposed various program and evaluation designs with children and/or women as their primary target audience. Numerous applications were received, including ongoing SNAP-Ed programs, modifications to existing programs, or new programming models. Each application was competitively scored and ranked by an independent technical review panel, chaired by FNS. The quality criteria used for scoring are shown in exhibit I-2. The highest scoring applicants were selected as finalists and asked to respond to clarification questions. Based on these responses, the review panel selected four projects to participate in the study:

- ▲ **Chickasaw Nation Nutrition Services' (CNNS) Eagle Adventure**
- ▲ **New York State Department of Health's (NYSDOH) Eat Well Play Hard in Child Care Settings,**
- ▲ **University of Nevada Cooperative Extension Service's (UNCE) All 4 Kids, and**
- ▲ **Pennsylvania State University's (PSU) About Eating.**

Each of the four agencies implemented model SNAP-Ed programs in fiscal year (FY) 2010 and conducted their own evaluations, supported by SNAP-Ed administrative funds and State and local matching resources. Selected demonstration projects 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

Exhibit I-2.— Scoring Criteria Used For Demonstration Project Selection

Criterion	Specific Requirements
Quality of intervention plan (30 points)	<ul style="list-style-type: none">• Incorporates SNAP-Ed Guiding Principles• Budgets are provided as per SNAP-Ed annual guidance
Intervention schedule fits the proposed FNS data collection period (5 points)	<ul style="list-style-type: none">• Intervention will begin and end sometime between March 2010 and September 2010
Suitability for an FNS evaluation using a rigorous impact evaluation design (30 points)	<ul style="list-style-type: none">• Can support the random assignment of multiple units (person, classes, etc.) to treatment and control conditions or the quasi-experimental, non-random assignment of matched units to both treatment and control groups• If <i>other</i> nutrition education or promotions are delivered to the target audience, they are delivered to both the treatment and control groups during the course of the project
Promise for replication (15 points)	<ul style="list-style-type: none">• <i>Does not</i> 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 (20 points)	<ul style="list-style-type: none">• Individuals with key project responsibilities are identified and their allocated hours are indicated and adequate• Proposed staff members are well qualified and planned training is provided

participants, participation in interviews, record keeping, and providing documents describing the implementer’s SNAP-Ed intervention and evaluation processes.

The evaluation of CNNS’ Eagle Adventure demonstration project is the focus of this case study report. Similar case study reports have been prepared for the other demonstration projects. Key evaluation findings and cross-cutting themes from all Wave I demonstration projects are presented in a separate final report.⁵

B. Overview of the Eagle Adventure Program

The goal of the CNNS Eagle Adventure Program is to prevent diabetes in Native American families by using a culturally appropriate intervention strategy aimed at children and delivered through schools. The nutrition education messages and materials build upon a “type 2” diabetes prevention program developed by the Centers for Disease Control and Prevention (CDC) Division of Diabetes Translation’s Native Diabetes Wellness Program, the Tribal Leaders Diabetes Committee, and the Indian Health Service. The Chickasaw Nation developed the Eagle Adventure curriculum based upon the CDC Eagle Books, and used the opportunity of the FNS-funded *Models of SNAP Education and Evaluation* Project to implement their approach. CNNS’ approach encourages children to increase consumption of fruits and vegetables, and balance calorie intake with energy expenditure through increased physical activity. The program is primarily directed at elementary (first through third grades) school-aged children. This is accomplished through a series of objectives that include increasing children’s

- Intent to choose fruits and vegetables,
- Consumption of fruits and vegetables,

⁵ The individual case studies and integrated final report are published separately and available at: www.fns.usda.gov/ora.

- Knowledge of fruits and vegetables as healthful snack options,
- Intent to participate in physical activities,
- Actual physical activity behaviors, and
- Knowledge of healthful physical activities.

Eagle Adventure is one of several components of the multifaceted *Get Fresh!* SNAP-Ed program, which has been implemented by CNNS since 2004. *Get Fresh!* is currently implemented within the Chickasaw Nation boundaries, which spans 13 counties in south central Oklahoma with a focus on Native American populations, which are at high risk for health problems related to overweight and obesity. The *Get Fresh!* program includes

- Cooking shows,
- A youth component that involves activities such as food tastings,
- Social marketing, and
- The Eagle Adventure program (since 2010).

While designed as a school-based intervention, the Eagle Adventure program was developed using the social ecological model as a framework. The program includes both direct and indirect modes of education delivery and evokes behavior changes by providing multiple levels of message delivery, including lessons for children in a classroom setting, parent and caregiver take-home materials and activities, the display of posters and banners throughout the school, and schoolwide announcements related to the program.

The Eagle Adventure program or curriculum is officially kicked off through the performance of the four-act Eagle Play, which is intended to capture the attention and interest of the first- through third-grade target audience. Following the play, participating classrooms receive four 40-minute in-class lessons implemented over an approximate 2-month period. Corresponding take-home materials, activities, and homework assignments called “Nestwork” are sent home after each lesson. Parents and caregivers are encouraged to engage in the suggested activities and complete the homework with their child. In doing so, parents and caregivers are exposed to the program’s key messages, which they can reinforce with their children. Additional indirect educational materials, such as banners and posters, are displayed inside and outside the school.

Implemented for the first time as part of this demonstration project evaluation, Eagle Adventure was conducted from March through May 2010 at five public elementary schools in Pontotoc County, OK, with Native American populations that exceed the State average of 19 percent and where more than 50 percent of the children are eligible to receive free and reduced price lunches. The intervention anticipated reaching approximately 700 students through direct and indirect education and 800–1,000 parents and caregivers through indirect education. Five elementary schools in Bryan County served as comparison sites.

C. Organization of the Report

This report provides a detailed summary of the findings and conclusions of, as well as the specific methods used in, the evaluation of the Eagle Adventure demonstration project. Outlined below are the topics addressed in each of the remaining chapters of this report:

- Chapter II: Process Evaluation Methods and Results,
- Chapter III: Impact Evaluation Methods and Results,
- Chapter IV: Assessment of CNNS’ Self-Evaluation, and
- Chapter V: Conclusions and Discussion.

Following these chapters is a series of appendices which include data collection instruments, supplemental data, and detailed descriptions of the methods employed for each of the three components of the evaluation. Additionally, appendix J provides a complete list of all cited references within this report.

Chapter II ● Process Evaluation Methods and Results

This chapter describes the findings of the process evaluation of the CNNS Eagle Adventure demonstration project. The overall goal of the process evaluation is to describe the design and implementation of the intervention as well as to examine successes of the implementation process from the perspectives of the program managers, direct educators, intervention site staff, and program participants. The data sources, data collection methods, and analysis approach for the process evaluation are summarized below and described in detail in appendix G.

A. Process Evaluation Methods

The broad process-focused research questions described in Chapter I guided the design of the Eagle Adventure 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 secondary and primary data sources using multiple methods, including data abstraction; in-depth, open-ended interviews with stakeholders; direct nutrition education observation; focus groups with parents or caregivers of nutrition education recipients; and paper questionnaires designed to collect information on other nutrition education activities.

1. Data Sources

The secondary data sources that were collected and reviewed at various stages of the evaluation are provided in exhibit II-1. These served as rich sources of descriptive, objective information on key aspects of the demonstration project's design and implementation. The data sources that were collected and reviewed by the evaluation team can be categorized into four groups: planning and reporting documents, implementation documents, administrative data on program reach and dosage, and program costs.

Key Findings

- **Program Reach and Cost:** The Eagle Adventure demonstration project reached approximately 714 children across 37 classrooms and as many as 800–1,000 parents and caregivers through take-home materials and activities at an estimated cost of \$92.90 per child.
- **Ease of Implementation:** Program staff, direct educators, and principals and administrators reported that Eagle Adventure program implementation went very well and that it was relatively easy and straightforward to implement.
- **Caregiver Satisfaction:** Parent and caregiver survey results and focus group discussions revealed a relatively high level of use and satisfaction with the program materials.
- **Program Fidelity and Teacher Engagement:** There was some variation between planned and actual activities implemented in each school, especially in terms of the time allotted for each lesson which may have affected desired outcomes. Participation and engagement of classroom teachers in the lessons also varied.
- **Accessibility:** Input from program staff members, parents, and caregivers suggested that revisions could be made in order to make this intervention more accessible to low-resource families and to the diverse population it seeks to serve.

Exhibit II-1.— Secondary Data Collected for the Process Evaluation of the Eagle Adventure Demonstration Project

Document Category	Specific Documents Reviewed
Planning and Reporting Documents	<ul style="list-style-type: none"> • Demonstration project application • FY 2010 SNAP-Ed Plan
Implementation Documents	<ul style="list-style-type: none"> • Nutrition education lesson plans • Nutrition education materials • Training curriculum and protocols
Administrative Data on Program Reach and Dosage	<ul style="list-style-type: none"> • Type and number of indirect contacts made • Demographic information on participants at each intervention site • Planned and actual number of children in the direct education interventions at each site • Type of educator implementing the direct education at each site (e.g., professionals or paraprofessionals) • Activity logs documenting lesson duration and implementation schedule by classroom
Program Costs *	<ul style="list-style-type: none"> • Standardized cost tables consistent with FNS SNAP-Ed expenditure reporting requirements

*The evaluators provided a form for CNNS to complete to ensure cost data were collected in a standardized way (see "Resource and expenses tracking form" in appendix A).

Primary data were collected from three categories of key informants—program-level staff members, intervention site key contacts, and program participants. The timing of data collection from key informants through onsite visits took place approximately one month prior to the start of the intervention (February 2010) and immediately following completion of the intervention (May 2010). Key informant interviews were conducted during both time periods with all of the CNNS staff involved in the planning, design, and implementation of the Eagle Adventure intervention ($n = 5$) as well as administrators from each of the five intervention schools ($n = 5$).

Another important component of the process evaluation was the assessment of the experience and satisfaction of the parents and caregivers with the intervention. Information was collected on factors such as program accessibility for parents and caregivers, perceived goals of the program, how the program helped them change their children’s nutrition behaviors, and potential barriers faced in trying to increase their fruit and vegetable intake. These data were collected through a post-intervention parent survey and focus groups with a subset of parents and caregivers who responded to the survey.

Descriptive information about the types of respondents and timing of data collection are presented in exhibit II-2. Parent focus groups were also conducted post-intervention. Descriptive statistics on the demographics of focus group participants are provided in appendix B.

At each of the school site visits, evaluation team members also observed several classes. During these observations, the classroom setting, classroom teachers’ role, participants’ interest in the nutrition education lessons, and a description of how implementation was consistent with or deviated from the lesson plan were documented. The evaluator also spoke briefly with the direct educator after the class observation to identify facilitators and challenges to implementation of the lesson plan in the observed setting. To obtain participants’ views and experiences with the program, three focus groups were conducted post-intervention with parents and caregivers of children in the intervention classrooms.

Exhibit II-2.— Eagle Adventure Respondent Types, Data Collection Methods, and Number of Respondents

Type of Respondent	Data Collection Method	Number of Respondents	
		Pre-intervention	Post-intervention
Program Staff			
Program Manager or Administrator	Interview	1	1
Outcome Coordinator	Interview	1	1
Program Coordinator or Direct Educator	Interview	1	1
Direct Educator	Interview	1	1
Evaluation Coordinator	Interview	1	1
Intervention School Staff			
School Principals or Superintendents	Interview	5	5
Program Participants			
Parents or other primary caregivers of children who participated in Eagle Adventure Program nutrition education	Focus Group	n/a	3 groups (23 adults)
	Survey (process questions included in parent follow-up survey)	n/a	344

Note: n/a= not applicable

2. Instrumentation

Data collectors used a set of standardized secondary data abstraction tools and primary data collection instruments for the process evaluation. The wording of many of the questions in each key informant interview guide and the focus group discussion guide was tailored to the specific characteristics of the Eagle Adventure program. All data collectors were trained on the use of these approved instruments to collect information essential to answering the process-related research questions and queries. In addition, key informant interviews included relevant, probing questions to allow for in-depth discussions of important issues or topics. Data collection commenced in early 2010. Copies of most of the instruments are provided in appendix A. The parent follow-up survey instrument which was also used for the impact evaluation is included in appendix C.

3. Analysis Approach

The evaluation team applied an analysis approach to the data that takes into account the range of data and respondent types used in the process evaluation. Key informant responses from CNNS staff and school principals to each interview question were compiled into a master Microsoft Word 2007 document and organized by broad process evaluation research question 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 facilitators and challenges) and specific topics (e.g., lesson plan scheduling) as well as agreement and disagreement amongst respondents. Direct quotations were also identified where relevant and used to support key findings.

Transcripts from focus groups with parents or caregivers of nutrition education recipients were coded in QSR International NVivo version 8, which allowed the evaluation team to systematically organize,

process, and summarize information provided by this key stakeholder group. It also allowed us to capture the breadth of opinions offered by parents or caregivers while identifying common themes and issues. Direct quotations were also identified and used to support key findings.

Quantitative process data were primarily used to describe objective aspects of the Eagle Adventure, such as those related to dose, reach, and costs. With the exception of cost data, which were provided through a series of standardized tables, these data were received in or entered into Microsoft Excel spreadsheets. Excel was then used to conduct basic frequencies and mean tabulations. Quantitative process data collected from parents or caregivers through the parent follow-up survey were analyzed using SAS 9.2. Frequencies of responses to each process question are reported in appendix B and incorporated with the qualitative findings that follow in this chapter.

B. Program Development and Design

1. Program Development

The need and rationale for developing the Eagle Adventure program was established through formative research conducted by CNNS staff starting in 2006. Focus groups conducted by members of the Eagle Adventure development team with 43 Native American women in the Chickasaw Nation boundaries (Parker et al., 2008) were instrumental in the conceptualization of the Eagle Adventure program. Women in these focus groups reported a preference for interventions that are fun, exciting, and intergenerational as well as wanting nutrition education programs focused on diabetes prevention. They also suggested that schools would be an appropriate venue for such an intervention. This insight, coupled with an extensive review of literature and existing nutrition education models, led to the development of a program that CNNS felt would be culturally appropriate and most effective in meeting the primary objectives: to impart positive change related to children's food and physical activity knowledge and behaviors.

The design of the Eagle Adventure program is theoretically based and centered on the Eagle Books, a series of four books with animal characters who engage in physical activity, eat healthy foods, and learn from their elders about traditional ways of being healthy. The books were developed by the CDC Division of Diabetes Translation's Native Diabetes Wellness Program, in collaboration with the Tribal Leaders Diabetes Committee and the Indian Health Service, in response to the burden of diabetes among Native Americans and the need for diabetes prevention materials for children.⁶

Using the social ecological model as a framework and the Eagle Books as a central construct, CNNS developed a four-act play, four classroom lessons, and numerous indirect and take-home nutrition education materials to ensure that individual (grade-school children), interpersonal (parents and caregivers), and organizational (the school environment via posters and announcements) levels of influence were incorporated. Program developers noted that two studies—Perry (2002) and Jackson (2004), both of which tested the effectiveness of using theater as an educational strategy for communicating nutrition messages to school-age youth—were instrumental in their decision to develop and include a dramatic play as a channel of message delivery.

CNNS staff described the development process as being very collaborative and inclusive of all team members, including the primary direct educator who had a substantial amount of input. After the program manager and outcome coordinator had outlined the four lessons in the early stages, they assembled an

⁶ More information on the Eagle Books can be found at <http://www.cdc.gov/diabetes/pubs/eagle.htm>.

experienced and multidisciplinary team to further develop the curriculum and various program components. Additionally, members of this team described their partnerships with Chickasaw Nation's Performing Arts Department as instrumental to the development of the Eagle Adventure play, a critical component of the program.

Because of time constraints, pilot testing took place only in two first-grade classes and was primarily intended to provide the direct educators the opportunity to run through the lessons one time. The purpose of this run-through was to increase their comfort level with administering the lessons and to ensure that the lessons could be implemented within the planned 40 minutes. The pilot testing was also intended to test CNNS' evaluation data collection instruments with the target audience as well as to observe the direct educators' administration of those instruments for training purposes. When asked about pilot testing of the Eagle Adventure program, one of the CNNS key informants explained that pilot testing was not extensive and that they would have liked to have done more.

2. Description of the Curriculum

The four components composing the Eagle Adventure intervention included a four-act play, direct education provided in the classroom, indirect education provided through take-home materials and activities, and indirect education provided in the school environment. Furthermore, a number of materials developed by the Eagle Adventure Team were used to facilitate the delivery of the Eagle Adventure nutrition education program both inside and outside the classroom. This section describes each of the four main program components as well as any related materials.

▲ A play

The Eagle Adventure intervention was officially kicked off in each of the schools with the previously described four-act play. This play brought the four Eagle Books to life through the use of culturally appropriate characters and aimed to alter social norms through positive behavior modeling. The play was also intended to help capture the attention of the audience and build interest in the program prior to implementing direct education in the classrooms. Performers included members of the Eagle Adventure team, youth volunteers from the 4-H club, and an individual from the Chickasaw Nation Performing Arts Department.

▲ Direct education lessons delivered in the classroom setting

Following the play, four nutrition education lessons were administered in the intervention classrooms, with the lessons corresponding and reinforcing messages from each of the four Eagle Books. Exhibit II-3 summarizes the core nutrition education messages and activities of the lessons. Some of the materials used to support the lessons, such as shakers (plastic bottles filled with beans) for the "snake dance," were assembled by the child participants during the lesson and served as materials that the children could subsequently take home.

Exhibit II-3.— Summary of Eagle Adventure Nutrition Education Messages and Planned Activities, by Lesson

Lesson and Book	Key Nutrition Education Messages	Planned Activities	
Through the Eyes of the Eagle Eagle Book 1	<ul style="list-style-type: none"> • Diabetes can be prevented by balancing calorie intake with energy expenditure • Food choices that are more or less healthy than others • Activities that students participate in to stay active • What it means to be “healthy” and what “balance” is • Make cultural connections or provide translations of keywords into Chickasaw 	Facilitated group discussion, including reading part of Eagle Book	10 min
		Balance activity	20 min
		Wrap-up and review of take-home materials	10 min
		Total approximate length	40 min
Knees Lifted High Eagle Book 2	<ul style="list-style-type: none"> • Physical activity is an important component of diabetes prevention • Description of diabetes: “when your body does not use the food in the right way, so there is too much sugar, or glucose, in the blood” • Review of “balance” definition • Make cultural connections or provide translations of keywords into Chickasaw 	Facilitated group discussion, including reading part of Eagle Book	10 min
		Hands-on activity: make a shaker and “snake-dance”	20 min
		Wrap-up and review of take-home materials	10 min
		Total approximate length	40 min
Plate Full of Color Eagle Book 3	<ul style="list-style-type: none"> • Colorful fruits and vegetables are necessary to maintain a healthy, balanced body • Develop body connections with fruit and vegetable color groups • Healthy food choices are important for diabetes prevention • Make cultural connections or provide translations of keywords into Chickasaw 	Facilitated group discussion, including reading part of Eagle Book	10 min
		Hands-on activity: Harvest and Body Connections and “Make a Salad” game	20 min
		Wrap-up and review of take-home materials	10 min
		Total approximate length	40 min
Tricky Treats Eagle Book 4	<ul style="list-style-type: none"> • Recognizing body clues that tell them when they are hungry or full • “Sometimes” versus “everyday” foods • Define “everyday foods,” “sometimes foods,” “hungry,” and “full” • Make cultural connections or provide translations of keywords into Chickasaw 	Facilitated group discussion, including reading part of Eagle Book, with Backpack activity	10 min
		Hands-on balloon and backpack activity	20 min
		Wrap-up and review of take-home materials	10 min
		Total approximate length	40 min

While each of the four lessons was designed to last approximately 40 minutes, in some cases the schools participating in the demonstration project could consistently offer only a 25- to 35-minute period in the classrooms. CNNS planned to administer the first lesson during the same week as the play performance, with a full 1–2 weeks between each subsequent classroom lesson. Exhibit II-4 provides the planned intervention schedule. However, for the purposes of the demonstration project, CNNS was not able to follow the

Exhibit II-4.— Planned Implementation Timeline for the Eagle Adventure Program Intervention

Timeline	Intervention component
Week 1	Eagle Book Play
Week 2	Administer Eagle Book 1 lesson
Week 3	Eagle Book 1 take-home materials, including Nestwork
Week 4	Turn in Eagle 1 Nestwork and Administer Eagle Book 2 lesson
Week 5	Eagle Book 2 take-home materials, including Nestwork
Week 6	Turn in Eagle 2 Nestwork and Administer Eagle Book 3 lesson
Week 7	Eagle Book 3 take-home materials, including Nestwork
Week 8	Turn in Eagle 3 Nestwork and Administer Eagle Book 4 lesson
Week 9	Eagle Book 4 take-home materials, including Nestwork

implementation schedule as planned. Information about how the program was actually implemented, including the average duration of lessons and timelines for each school, is provided in Section C.

▲ Indirect education provided through take-home materials and activities

CNNS offered indirect education to reinforce key nutrition education messages by providing program participants with numerous take-home materials and homework. These materials were aimed at the “interpersonal and organizational levels of influence” (CNNS, 2008). The materials that were sent home with children after each lesson were intended to reach or target their parents or caregivers and included the following:

- A copy of the Eagle Book to encourage parents and caregivers to read the book with their child,
- Homework assignments called Nestwork related to in-class lesson for parents and caregivers to complete with their children,
- Recipe cards with healthy, simple, low-cost recipe ideas that children could help their parents or caregivers make,
- Parent and caregiver tip sheets with ideas for age-appropriate activities for their children, and
- “Eagle Receipts” or note cards with a list of all the take-home activities that children could do with their parents or caregivers as well as a place for them to mark which activities were completed.

Children were directed to return their “Eagle Receipts” during the next lesson and were rewarded with a sticker each week. At the end of the program, a medal was given to all students for their participation in any and all aspects of the program.

▲ Indirect education provided in the school environment

CNNS also offered indirect education in the form of a banner that was displayed outside the school; posters corresponding to each Eagle Book were displayed inside the school in hallways, cafeterias, and classrooms receiving the intervention. Additionally, CNNS asked school principals or other administrators to read a series of brief, daily announcements called Eagle Tips over the school intercom as part of morning announcements during the same week as the corresponding lesson. Eagle Tips

included nutrition-focused messages that were consistent with the four Eagle Adventure lessons. The posters and announcements, which were developed by the Eagle Adventure team, were intended to promote positive reinforcement of healthful behaviors in the school environment.

C. How the Demonstration Project Was Implemented

1. Program Management and Oversight

The Eagle Adventure team was relatively small and worked very collaboratively with one another to design, plan, and implement the demonstration project. Exhibit II-5 provides an overview of the key Eagle Adventure team members and their respective roles or involvement with the program. The titles used in this exhibit will be used when referencing these individuals throughout the report. Because it is a component of the larger *Get Fresh!* program, there was significant overlap in the personnel used to design, manage, and implement the Eagle Adventure nutrition education program.

Exhibit II-5.— Summary of Eagle Adventure Project Staff Roles and Responsibilities

Position	Summary Responsibilities	Program Administration	Design and Development	Planning	Implementation	Evaluation Design and Planning	Data Collection	Data Tabulations
Program Manager	Generally administered program; assisted in design, development, and planning; provided program oversight during implementation and evaluation phases of the project	•	•	•	•	•		
Outcomes Coordinator	Guided demonstration project development and selection of education goals; developed evaluation; provided training to data collectors; completed data tabulations		•	•		•		•
Program Coordinator and Direct Educator	Coordinated demonstration project related activities and developed Eagle Adventure curriculum; developed and reviewed project materials; trained direct educator; provided direct nutrition education		•	•	•		•	
Direct Educator	Assisted with development of the nutrition education materials; provided direct nutrition education		•	•	•		•	
Evaluation Coordinator	Assisted with development of nutrition education materials and the evaluation, provision of training, and data entry and tabulations		•	•		•		•

2. Partnerships

CNNS staff described several partners, who were involved in the design and implementation of the Eagle Adventure program, as being instrumental:

- Oklahoma State University provided staff support for the development and implementation of the Eagle Adventure program. Specifically, the outcomes coordinator for the Eagle Adventure demonstration project is affiliated with OSU and the evaluation coordinator is employed by OSU.
- The Chickasaw Nation’s Performing Arts Department helped develop the script for the Eagle Adventure play from the Eagle Books and the performing arts director played one of the characters in the play.
- The Chickasaw Nation Division of Communication composed the music for the Eagle song, took professional photos for the Eagle recipes, and provided expertise for the parent information letter.
- The Chickasaw Nation Division of Health Institutional Review Board provided insight and approval of evaluation and reporting procedures.
- The Pontotoc County 4-H Nutrition and Home School Clubs provided youth performers to play various roles in the Eagle Adventure play.
- Elementary schools in Pontotoc County served as the intervention schools and allowed CNNS to implement the Eagle Adventure program in the first-, second-, and third-grade classrooms.

The CNNS program manager and outcome coordinator explained that the partnerships with Chickasaw Nation’s Performing Arts Department and the 4-H Club were based on existing relationships and thus were relatively easy to form. Developing partnerships with the schools took more effort and required the program manager and her staff to establish relationships with and “buy-in” from the principals and superintendents, as is described below in the section on recruitment of elementary schools.

3. Direct Educators and Their Training

Two direct educators were used to deliver the Eagle Adventure program for this demonstration project. When asked what skills, qualifications, and qualities that they thought were critical for direct educators of the Eagle Adventure program to possess, key informants from the CNNS staff cited passion, intelligence, and flexibility or adaptability. Furthermore, members of the team reported that it was not critical for the direct educators to have an advanced degree. However, it was important that they have good organizational skills and feel a sense of ownership in the program.

The two direct educators who implemented the Eagle Adventure program had varying skills, levels of education, and experience working with youth. One direct educator had a master’s of science in public health degree in environmental health and approximately 5 years of experience providing nutrition- and health-related education to low-income children and their families prior to joining the Eagle Adventure team. She was an integral part of the Eagle Adventure development team and, as such, was described by the outcome coordinator as being instrumental as a peer educator and trainer for the other direct educator and assistants.

The other direct educator had a degree in early childhood education and prior experience in Oklahoma elementary schools as both a school teacher and most recently, as a *Get Fresh!* educator. Her extensive classroom teaching experience made her very knowledgeable about educational standards, which was very advantageous in trying to incorporate some of these into the Eagle Adventure program.

To prepare the direct educators for implementation of the Eagle Adventure program, the outcome coordinator led the team in a facilitated training process that she described as “intentionally integrated” (i.e., not led in a top-down approach). The following is a list of the Eagle Adventure direct educators’ primary training components:

- A formal overview of lessons and both the outcome and process evaluation procedures,
- Educator demonstration of the Eagle Adventure lesson,
- Educator demonstration of the outcomes evaluation instrument, and
- Independent study and practice of the lessons for approximately 40 hours prior to administering the first intervention lesson.

In addition to training specifically related to the Eagle Adventure program and evaluation, CNNS educators receive approximately 30 hours of nutrition content training per year. The program manager coordinates all ongoing nutrition content training, which is part of *Get Fresh!* continuous employee education.

4. Recruitment of Elementary Schools

CNNS initiated recruitment of eligible elementary schools in summer 2008, prior to submitting their demonstration project application to FNS. At this time, CNNS staff contacted school administrators and principals and asked that they sign a willingness to participate document. To the extent possible, CNNS reached out to schools with which they had some personal or professional connection, because they knew this would help facilitate recruitment. Five schools were recruited. Once CNNS was notified of their selection as a demonstration project in fall 2009, CNNS staff again contacted these administrators to confirm their willingness to participate. In December 2009, the program manager and the program coordinator and direct educator conducted in-person introductory sessions with school administrators and confirmed and finalized the participation of each.

5. Methods for Quality Assurance and Tracking Program Fidelity

Quality control primarily took the form of onsite observations conducted by the program manager. She was able to observe each educator implement various lessons of the Eagle Adventure program. The outcomes coordinator and evaluation coordinator also observed each of the lessons, with the exception of the first lesson, at least once. However, their site visits were focused not on quality control with regard to the educator and their implementation of the intervention, but rather on student receptivity to the Eagle Adventure program and administration of the evaluation instrument.

The Eagle Adventure team documented several key measures related to program fidelity, including the frequency and duration of lessons as implemented, the number of students present, the display of indirect educational materials in the school setting, and the presence of teachers in the classroom during the lessons.

6. Program Reach

Eagle Adventure was implemented for the first time during this study, between March and May 2010. During this period, a total of 37 first- through third-grade classrooms across five schools in Pontotoc County, Oklahoma, received the Eagle Adventure program. Based on classroom enrollment approximately 2 months prior to implementation, the program had the potential to reach 714 children (table II-1).

Table II-1.—Eagle Adventure Program Reach

Elementary Schools	Number of Classrooms Where Intervention Took Place	Total Number of Children Participating in Intervention*	Mean Size (Number of Children) of Intervention Classrooms
Homer	16	313	20
Vanoss	6	109	18
Francis	6	120	20
Allen	6	101	17
Roff	3	71	24
Overall Total	37	714	19

*Participation was based on student enrollment for each intervention classroom.

Source: Eagle Adventure program data provided by CNNS

7. Program Dosage and Exposure

a. Classroom lessons

In addition to knowing how many children were enrolled in the program, it is important to know how much of the intervention participants received. Because CNNS tracked participation only at the classroom level and not at the individual level, program dosage is presented in terms of the total number of minutes that children were exposed to the intervention by school and their relative use and exposure to the written material of the program based on parent and caregiver reports in the post-intervention survey. Analysis of the Eagle Adventure program data show that on average, children in the intervention classrooms received a total of 145 minutes of nutrition education through the Eagle Adventure program (table II-2). As previously described, each of the four Eagle Adventure lessons was designed to be implemented in approximately 40 minutes, but the intervention schools could consistently offer only an average of 30 minutes during the school day; in fact, they made this a stipulation of their participation in the program.

Table II-2.— Average Exposure to Eagle Adventure Direct Education by School

School	Average Exposure to Classroom Lessons and Play (Minutes)					
	Play	Lesson 1	Lesson 2	Lesson 3	Lesson 4	Total
Allen	25	35	32	34	34	160
Francis	25	25	27	27	25	128
Homer	25	28	28	28	29	139
Roff	25	27	27	31	27	137
Vanoss	25	34	31	36	33	159
AVERAGE	<i>25</i>	<i>30</i>	<i>29</i>	<i>31</i>	<i>30</i>	<i>145</i>

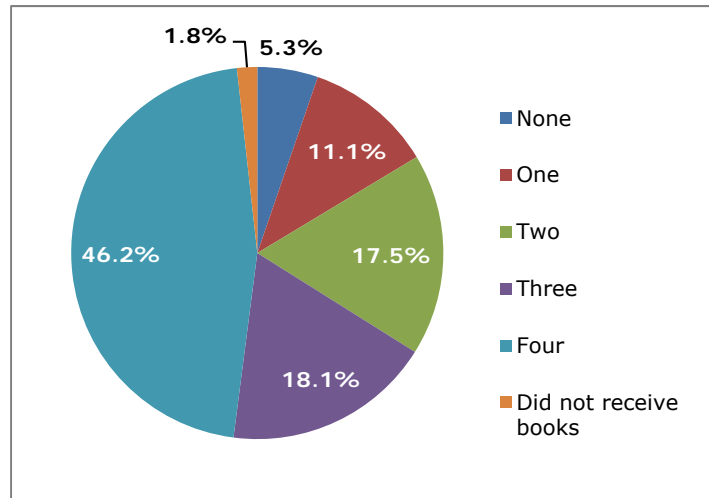
Source: Eagle Adventure administrative data provided by CNNS

b. Parent and caregiver exposure to take-home materials and activities

As depicted in figure II-1, when surveyed parents and caregivers were asked how many Eagle Books they had read to their children, more than 46 percent reported reading all four, an additional 18 percent reported reading three, and only 5 percent did not read any. When asked about their use of other take-

home materials, nearly 71 percent of parents and caregivers reported using at least one recipe to prepare a snack or meal for their children (figure II-2), and more than 80 percent completed one or more Nestwork

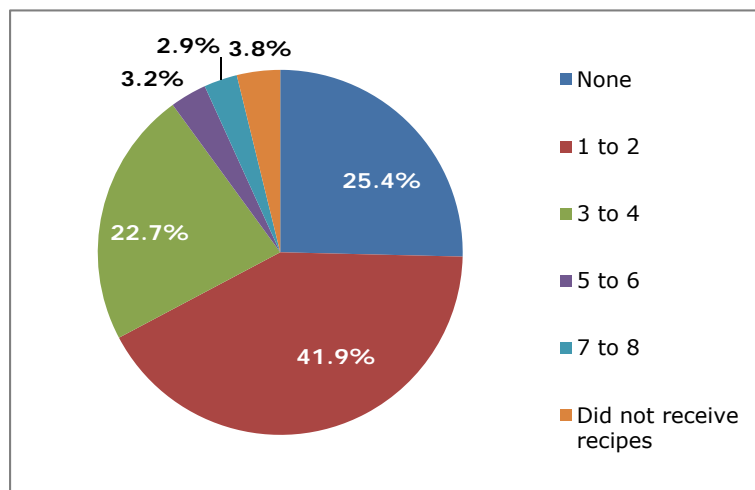
Figure II-1.— Percentage of Parents and Caregivers Who Reported Reading Eagle Books to Their Children, by Number of Books Read ($n = 342$)*



*The number excludes the 2 respondents who answered "Don't know" or had no response to this question.

Source: Parent follow-up survey, table B-1 on "Use of Take-Home Materials from the Eagle Adventure Program," in appendix B

Figure II-2.— Percentage of Parents and Caregivers Who Reported Using Eagle Adventure Recipes, by number of recipes used ($n = 339$)*

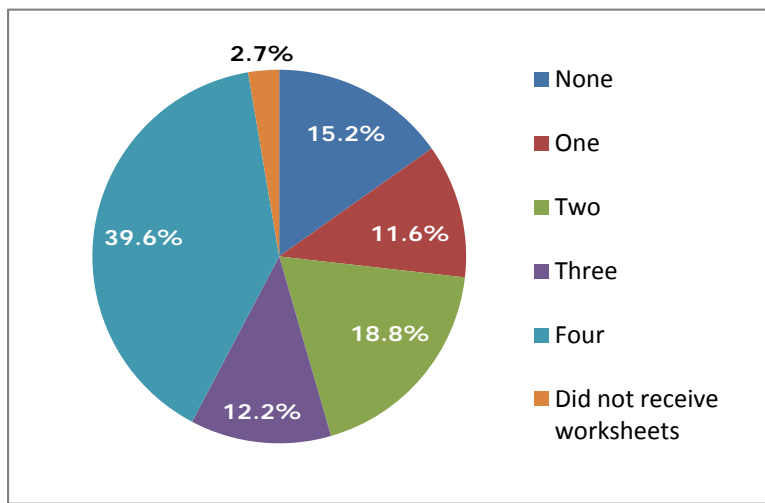


*The number excludes the 5 respondents who answered "Don't know" or had no response to this question.

Source: Parent follow-up survey, table B-1 on "Use of Take-Home Materials from the Eagle Adventure Program," in appendix B

assignments with their children (figure II-3). Only a small percentage of parents and caregivers reported that they did not receive the Eagle Books, recipes, or Nestwork—1.8, 3.8, and 2.7 percent, respectively. Parent and caregiver use of materials was also examined by school. Some variation in parent’s self-reported use of materials was observed by school; however, samples sizes were too small to determine whether or not these differences were statistically significant.

Figure II-3.— Percentage of Parents and Caregivers Who Reported Completing Nestwork Worksheets and Returning Them to the Children’s Teachers, by Number of Assignments Returned (*n* = 336) *



*The number excludes the 8 respondents who answered “Don’t know” or had no response to this question.

Source: Parent follow-up survey, table B-1 on “Use of Take-Home Materials from the Eagle Adventure Program,” in appendix B

c. Exposure in school environment

A series of brief announcements with nutrition-focused messages that were consistent with the four Eagle Adventure lessons were supposed to be read via the intercom as part of morning announcements everyday throughout the intervention period. Although morning announcements were considered a component of the program, they were not consistently provided across the five schools. Based on information gathered by CNNS, four of the schools did read Eagle Tip announcements on a daily basis throughout the intervention period, while the fifth school read most but not all of the Eagle Tips. Additional variation in the method of delivery was also noted, with three of the schools providing the messages over the school intercom as intended, one school providing the announcements in the classroom setting, and one school providing the announcements over the intercom and then switching to classroom delivery at some point during program implementation.

The Eagle Adventure banners were displayed outside each of the intervention schools as planned; however, they were not as large as the Eagle Adventure team had planned for them to be. The banners were intended to capture the attention of students and parents and caregivers alike as they drove up to or entered the school. Despite their less-than-ideal size, one principal reported that the banner was effective in getting parents’ and caregivers’ attention and strategies such as hanging the banner outside the school

and the posters inside the school did frequently lead to questions or conversations about the Eagle Adventure program.

8. Resources and Costs of Program Design and Implementation

This section discusses the cost of developing and implementing the Eagle Adventure program, and a breakout of the reported cost centers. It also includes an analysis of the costs as they related to the number of children served. The detailed budget tables CNNS provided for this evaluation, including a breakout of non-Federal and Federal funding for each budget category, are included in appendix B. Costs associated with CNNS' self-evaluation are reported separately in Chapter IV.

a. Costs for program design

Costs associated with the development of the Eagle Adventure program, which includes direct and indirect costs, totaled \$312,934. A vast majority of the funds used to support program development were from Federal sources (\$234,701). A total of \$77,752 in cash from non-Federal public funds and an additional \$481 of in-kind contributions were used to support program design costs.

Salaries and benefits were the most substantial cost center in terms of resources needed to develop the Eagle Adventure program, accounting for 82 percent of direct costs. The following is a summary of the staff resources used to support program development:

Position	Number of FTEs
Outcomes Coordinator	0.50
Program Manager	0.06
Program Coordinator	0.60
Direct Educators	1.00
Administrative Assistant	0.25
Performing Arts Department	0.01
Graphic design specialist	0.03
4-H members and volunteers	0.02
Total	2.4

Minimal amounts of noncapital equipment and travel were also required to support program development. Table II-3 shows the actual expenditures CNNS reports as the costs of designing the Eagle Adventure program.

Table II-3.— Summary of CNNS Costs Associated With Eagle Adventure Program Development

Budget Category	Expenditures	Percent of total costs
Salary and benefits	\$257,052.55	82.1
Noncapital equipment and supplies	\$910.25	0.3
Travel	\$2,295.76	0.9
Total Direct Costs	\$260,258.56	83.2
Indirect costs	\$52,676.33	16.8
Total	\$312,934.89	100

Source: Cost data provided by CNNS (see completed "Resource and expense tracking form" in appendix B)

b. Costs for program implementation

Costs included in this section are those that can be associated with the implementation of the intervention. They include direct and indirect costs.

- Total program cost for implementation: \$65,751.64
- Sources of funding by type:

Non-Federal public funds (cash)	\$15,360.56
Non-Federal public funds (in-kind)	\$1,077.35
Federal funds	\$49,313.73

The resources needed for the Eagle Adventure program implementation fall into four primary cost categories: salary and benefits, noncapital equipment and supplies, travel, and indirect costs. The types of expenditures that CNNS reported as included in the areas of salaries, non-capital equipment, materials, and travel are described below.⁷

- **Salary and benefits.** This expense includes the salaries or hourly wages for the implementing agency and partner staff that supported Eagle Adventure implementation directly or administratively. As shown in Section 2.1 of appendix B, the staffing costs for CNNS implementation includes the following:

Position	Number of FTEs
Program manager (1 person)	0.02
Direct educators (2 people)	0.27
Performing arts department	0.023
4-H and other volunteers	0.053
Total	0.366

- **Noncapital equipment and supplies.** This expense includes costs associated with producing and printing education materials, office supplies, small teacher (e.g., set of Eagle Books, puppets of Eagle Book characters, and classroom educational materials related to nutrition education) and student incentives (e.g., backpacks), and props and audio visual equipment required for the play production.
- **Travel.** The program travel expenditures include the costs for CNNS staff to travel to and from the five intervention schools to perform the Eagle Adventure play and to administer each of the four classroom lessons.

Table II-4 shows the actual expenditures CNNS reports as the costs of Eagle Adventure implementation in Federal FY 2010.

⁷ Budget justification language was provided by CNNS to Altarum and FTE information was extracted from CNNS Eagle Adventure Resources and Expenses Tracking Form (included in Appendix B).

Table II-4.—Summary of CNNS Costs for Implementation of Eagle Adventure Program (Federal FY 2010)

Budget Category	Expenditures	Percentage of Total Costs
Salary and benefits	\$22,594.32	34.4
Noncapital equipment and supplies	\$30,142.74	45.8
Travel	\$1,946.41	3.0
Total Direct Costs	\$54,683.67	83.2
Indirect costs	\$11,067.97	16.8
Total	\$65,751.64	100

Source: Cost data provided by CNNS (see completed "Resource and expense tracking form" in appendix B)

c. Per participant program cost

Calculating costs per program participant presents some challenges. Depending on the type of intervention, costs per program participant can be calculated based on the number of clients who receive a single intervention dose, complete the entire intervention, or are enrolled in a "site" where interventions are being conducted regardless of their receipt of education or materials. In addition, estimating costs associated with indirect education of parents and caregivers through the distribution and use of take-home materials is not straightforward, making it difficult to develop costs per program participant by participant type.

Because Eagle Adventure is a school-based program, the number of children enrolled in the intervention classrooms prior to the start of the intervention was used as the basis of the cost per participant calculation. Using the total program expenditures (\$65,751.64) and this total number of children potentially reached through direct education ($n = 714$), the estimated cost per child participant was \$92.09.

Additionally, because Eagle Adventure is a school-based program, it is important to note that there are economies of scale with practical implications on the resources required to replicate the program elsewhere. For example, the costs associated with implementing the program in a school with 10 children per classroom might not be substantially different from the costs associated with implementing the program in a school with 25 children per classroom, yet the reach of the program would be substantially greater for the latter scenario. For this reason, cost per classroom (\$1,777.07), which was derived using the same formula described above but with 37 classrooms as the denominator, was also estimated.

D. Factors Affecting Program Implementation and Opportunities for Improvement

Overall, program managers, direct educators, principals, and parents of children involved with the Eagle Adventure demonstration project reported that many factors in the program's design make it a most relevant and enjoyable program to implement. Furthermore, the flexibility and passion of the Eagle Adventure team members, as well as their devotion to quality and an in-depth understanding of the target audience were instrumental in gaining school cooperation and ensuring satisfaction with the program. At the same time, interviews with the program implementers, focus groups with parents and caregivers, and observation of the direct education identified several critical challenges to implementing this program in schools, particularly in reaching and engaging parents and caregivers. Many of the program implementers also provided recommendations for how the program could be modified to improve its reach or effectiveness.

The most commonly reported facilitators and challenges to program implementation are shown in exhibit II-6. They are described in more detail below along with recommendations for addressing the challenges identified. Quotes from key informants are included to highlight their perspectives.

Exhibit II -6.— Key Facilitators and Challenges to Eagle Adventure Implementation

Facilitators:

- Successful recruitment of schools
- Relevant and culturally appropriate nutrition education messages
- High-degree of satisfaction with program materials
- High-degree of satisfaction with the direct educators
- Modes of nutrition education delivery well received by key stakeholder groups

Challenges:

- Maximizing parent and caregiver awareness and engagement in the program
 - Implementation time frame
 - Varying levels of teacher engagement during the lessons
 - External factors reported to be inhibiting potential for behavior change
 - Additional staff support required in the classrooms
-

1. Facilitators of Program Implementation

▲ Successful recruitment of elementary schools

Recruitment of schools was a critical step to implementing the Eagle Adventure program. The program manager and program coordinator responsible for recruiting and confirming each school's participation in the program noted that some of the administrators seemed resistant, particularly with the intervention timeline interfering with standardized testing. However, CNNS program staff identified a number of factors they felt ultimately resulted in their successful recruitment of the schools, including their previously established rapport with the schools, the quality of the Eagle Adventure materials and staff, and relevance of the nutrition education messages. These perceptions of the CNNS staff were corroborated by principals during key informant interviews. Principals indicated that the quality and professionalism of the CNNS staff as well as the relevance of the nutrition education messages (facilitators that are described more extensively in the following sections) were paramount in their decision to allow Eagle Adventure into their schools. Several principals also indicated that the strong, positive reputation of Chickasaw Nation in the community influenced their decision to participate.

▲ Relevant and culturally appropriate nutrition education messages

The designers and planners of the Eagle Adventure program reported they strongly believe that the formative research used to guide the development of their program was critically important to engaging two key stakeholder groups: principals and program participants. Based on feedback from principals, the relevance of the program messages focusing on nutrition and physical activity (and more specifically diabetes prevention) influenced their decision to participate in the intervention. Several of the principals described both personal and professional concerns with such health-related topics and noted that they had children in their school who were diabetic or prediabetic.

Overall, parents and caregivers who participated in the focus groups reported being largely satisfied with the Eagle Adventure program. Specifically, they reported an appreciation for the program's emphasis on

positive and relevant nutrition education messages as well as its cultural appropriateness, and particularly liked that their children were being exposed to both at an early age. Some parents and caregivers specifically noted how the program helped them reinforce messages that they had already been trying to relay to their children at home, but with some resistance.

"I think it's great that we go and teach them at an early age about nutrition, how to eat right. There is a lot of families and a lot of Native American families that don't know too much about nutrition, not too much about diabetes."

—caregiver focus group participant

One parent in the focus groups specifically mentioned an appreciation for the distinction the program made between “sometimes” foods and “always” foods.

"It's teaching us, even if you already knew it or didn't know it, how to watch what you're eating. But then also, if you don't eat healthy, not that you have to do that all the time, it said on there 'sometimes.' I like that it didn't say never, because if I'm told I can't have it, that's when I go and overindulge in it. I believe it's teaching us what is healthier, and you could still have those other things, but if you ate too much of it, you could get diabetes."

—caregiver focus group participant

Furthermore, while many of the parent and caregiver participants in the focus groups were not Native American (see appendix B for focus group demographics), when asked about Eagle Adventure’s Native American influence, many of these parents and caregivers typically responded that they appreciated the cultural component of the program.

"And our kids need to be exposed to it the right way Just because we're not [Native American] doesn't mean that, they don't need to know other people's...because we don't have a culture, really."

—caregiver focus group participant

Likewise, some Native American parents and caregivers in the focus groups reported that the program’s portrayal of the Native American culture was appropriate, which they greatly appreciated. This sentiment was perhaps best captured by one focus group participant:

"I do have to say, too, I've seen cultural type demonstrations that were kind of done for children, and a lot of them have been highly inappropriate and almost offensive. But the things that were sent home from the Eagle were really nicely done. So I was actually impressed ... so I found it to be very appropriate."

—Native American caregiver focus group participant

▲ A high degree of satisfaction with program materials

The Eagle Adventure designers and implementers strongly believe that their development and use of professionally designed, colorful materials were very important in effectively reaching their audiences. The high quality of materials, from the posters to the parent and caregiver folders, was also acknowledged by the principals and reportedly contributed to their buy-in of the program. One principal also suggested that the use of such high-quality materials would be effective in encouraging parental or caregiver engagement at home.

| *“Everything they did was high quality.”*

—school principal

Indeed, many parents and caregivers reported satisfaction with the Eagle Adventure program materials. Some parents and caregivers, for example, cited the ease with which the Eagle Books could be incorporated into their daily schedule as well as their child’s interest in the books. This sentiment is further substantiated by the extensive use of the Eagle Books as reported by parents and caregivers on the post-intervention impact survey, described earlier.

| *“I liked the little books. I thought they were awesome. Because we are more nature oriented anyway so my children loved them, even my older girls were reading them.”*

—caregiver focus group participant

| *“The books, those for me and for [child’s name]—we usually have reading time, so that was easily incorporated into our daily activities. That was my favorite part.”*

—caregiver focus group participant

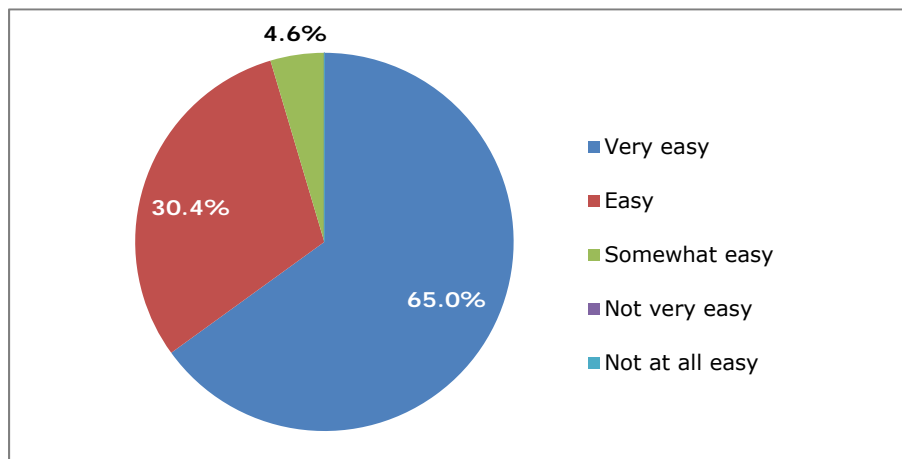
Caregivers in the focus groups also generally expressed satisfaction with the Network and recipes. According to parents and caregivers in the focus groups who had used them, the Network helped to reinforce nutrition focused messages at home and the recipes encouraged their children to try new fruits and vegetables. Additionally, parents and caregivers reported that the Network were colorful and attractive, unlike their children’s regular school work. Reportedly, this made the Network more appealing to their children. Several focus group participants also expressed satisfaction with the hands-on nature of the take-home materials as well as the fun, creative nature of the recipes. One participant explained:

| *“I thought they were very helpful, because it gave specific items that kids could work on and kids could help prepare, so I thought they were very helpful. Like, using peanut butter to hold the fruits together was cool. I never thought about that.”*

—caregiver focus group participant

Although not specifically cited as contributing to their satisfaction, when asked via the post-intervention impact survey about their level of understanding of the Eagle Adventure program materials, 95 percent of parents and caregivers reported that the materials were easy or very easy to understand (figure II-4).

Figure II-4.— Parents’ and Caregivers’ Levels of Understanding of the Eagle Adventure Program Materials Sent Home With Their Children (n = 326) *



*Eagle Adventure program materials included the Eagle Books, recipes, worksheets, and other materials and activities. The number excludes the 14 respondents who reported that they did not use the materials and the 4 respondents who answered “Don’t know” or had no response to this question.

Source: Parent follow-up survey, table B-2 on “Parent Satisfaction with Eagle Adventure Program Materials,” in appendix B

Additionally, when asked how useful the Eagle Adventure program materials were in helping their child eat healthier foods, 73 percent of parents and caregivers who responded to the post-intervention impact survey indicated that they were “useful” or “very useful” (figure II-5). Another 22 percent indicated that the materials were “somewhat useful” in effecting behavior change in their children. Focus group participants provided specific ways in which the materials or program messages had impacted some of their nutrition related behaviors or had been effective in helping them or their child to eat healthier, such as the reinforcement of messages already provided at home or parents’ and caregivers’ increased motivation to encourage their children to try new things.

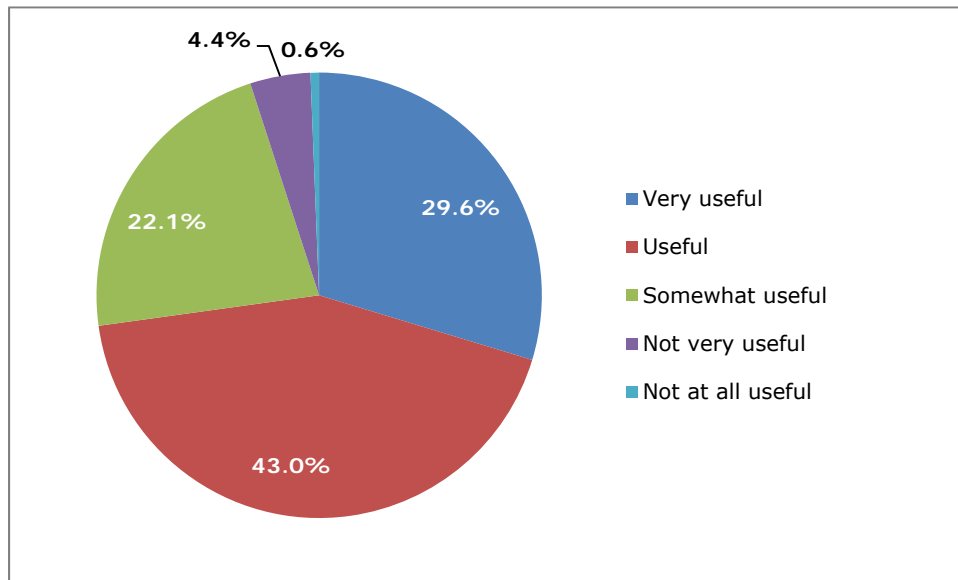
“I think it helped my kids realize that I was telling them the truth.”

—caregiver focus group participant

“There is a lot of times where I cook and I’ll cook a completely separate meal because he doesn’t like stir fry with the vegetables in it. I’m not doing that so much anymore. I like to at least put it in front of them, and if they just flat refuse ... then I’ll get them something else. But I’m trying to make them try more.”

—caregiver focus group participant

Figure II-5.— Parents' and Caregivers' Perceived Usefulness of the Eagle Adventure Program Materials in Helping Child Eat Healthier Foods (n = 320)^a



^a Eagle Adventure program materials included the Eagle Books, recipes, worksheets, and other materials and activities. The number excludes 18 respondents who reported that they did not use the materials and 5 of parents and caregivers who answered "Don't know" or had no response to this question.

Source: Parent follow-up survey, table B-2 on "Parent Satisfaction with Eagle Adventure Program Materials," in appendix B

▲ A high degree of satisfaction with Eagle Adventure direct educators

In addition to remarking on the quality of nutrition education materials, principals also noted their satisfaction with the CNNS staff who implemented the program. Some of the adjectives used by principals to describe the direct educators were: positive, flexible, professional, punctual, kind, and cordial. These statements provide some evidence that using external educators, or educators other than classroom teachers, could be beneficial, as was suggested by the Eagle Adventure planners and implementers. In fact, using external educators is something that the Eagle Adventure team felt strongly about and thought was critical to ensuring quality and fidelity as well as maximizing the effectiveness of the program. They had considered using classroom teachers to administer the lessons very early on in the development process, but ultimately decided against it, because they felt that to be most effective, the educator should be vested in and passionate about the program.

"It really struck me how energetic [the direct educator] was. It really was contagious to the kids."

—school principal

▲ Modes of nutrition education delivery well-received by key stakeholder groups

The Eagle Adventure implementers believe that the play was an important way to start the program. It was designed to be entertaining and culturally appropriate, keeping with the Native American tradition of storytelling, and sending a strong message about the Eagle Adventure program. Principals reported that the play was a hit with students.

“If you could have been at the play—the children were mesmerized, so captivated. And if you know anything about kids in this age group ... that’s says a lot!”

—school principal

When asked what they thought were the most useful aspects of the program for the age groups of children being targeted, principals specifically cited the repetition of nutrition education messages in various formats. While one principal remarked on the Eagle Tips offered during morning announcements as a means of both reinforcing messages with the intervention students and also engaging students not directly involved in the intervention, others noted the effectiveness of the banners and posters at gaining the attention of parents and caregivers and stimulating conversation.

“The Eagle Announcements over the intercom in the morning were also really effective in starting dialogue on related topics with the students, even those not directly involved in the program.”

—school principal

The Eagle Adventure program managers and direct educators also noted that the use of child incentives and other collateral materials, such as program backpacks and take-home items from the classroom activities, were important for engaging children and reinforcing messages. This notion was further supported by an observation made by one principal. In particular, she thought the backpacks were “trendy” and very well-received by the students and, therefore, an effective strategy for drawing parents’ and caregivers’ attention to the program.

2. Challenges to Implementation and Opportunities for Improvement

Program managers and principals recognized and reported several challenges that they faced in implementing the Eagle Adventure program. Interestingly, there was some overlap between the challenges cited by these key informants and the barriers reported by parents and caregivers of children in the intervention. This section provides a description of the challenges identified by these key stakeholder groups followed by recommendations for program improvement to specifically address some of the challenges or barriers that they cited.

▲ Maximizing parent and caregiver awareness of and engagement in the program

The Eagle Adventure team noted that maximizing parent awareness of and engagement in the program was both critical to its success and difficult to achieve. The staff spoke of this issue—reaching and engaging parents—in more general terms, not specifically as it relates to their observations or evaluation findings. Parents and caregivers in focus groups, although largely satisfied with the program, did identify three noteworthy barriers to their full participation in take-home activities. First, many focus group participants described the limited time they had to focus on the program materials and activities because of competing priorities, such as trying to help their children with regular schoolwork while preparing a family meal and providing care to younger children who demanded their attention or even caring for their elderly parents. Parents and caregivers also reported that in some cases, despite their children’s interest in the program, getting them to complete another homework assignment was challenging. A few parents and

caregivers also noted that their child would sometimes hand them the Nestwork the night before it was due, which also contributed to their lack of time to complete the homework.

“Because I’m trying to sit and try to do homework with the boy who doesn’t want to do homework, trying to cook dinner, and deal with two little kids ... I’m trying to get the homework done that has to be done, so if it’s not going to affect him in school and affect his grade, it’s not a priority.”

—caregiver focus group participant

Second, some parents and caregivers in the focus groups reported that, due to cost or time constraints related to buying ingredients they did not otherwise have in their home or that could go to waste, they were not able to make some or all of the recipes. As one mother reported, “One thing is some of the stuff on the list, if I bought it once to make the recipe, they’d never eat it again ... and it would sit in my house and go to waste.” Another mother commented on the infrequency with which she went grocery shopping and later indicated that if she had had more notice, she might have been able to buy some of the items:

“I only go shopping about every 6 weeks, so I wouldn’t even have the ingredients to try something that I thought she might even like ... so we didn’t mess with any of the food.”

—caregiver focus group participant

Third, a few parents and caregivers in the focus groups indicated that they had not received many or any of the Eagle Adventure take-home materials. However, when asked about their use of the various take-home materials, only 2–4 percent of parents and caregivers who responded to the impact survey reported that they did not receive the Eagle Books, recipes, or Nestwork.

“My son has an allergic reaction to homework, and I didn’t ever see those papers, so they’re probably stuffed in his desk.”

—caregiver focus group participant

Opportunities for Improvement. Program planners and implementers suggested a number of ways in which they could increase parent and caregiver awareness of the Eagle Adventure program. One suggestion was to add elements of a social marketing campaign—namely billboards and bus placards—to their current design, which represents a rather substantial addition to the methods employed for the demonstration project. However, other suggestions were less ambitious and would be fairly easy to implement, such as increasing the size of the banners displayed outside the schools and incorporating some of the Eagle Adventure activities into the school field day.

Parents and caregivers in the focus groups also offered two suggestions for how the program could be made more useful and visible. First, several focus group participants suggested that increased communication from the school about the program, such as when the program would be offered in their child’s classroom, who was implementing it, what the expectations were of parents and caregivers, and when they should be prepared to receive materials, would help enhance the program’s visibility and encourage parent and caregiver participation. Although the Eagle Adventure team sent a letter home to parents with some of this information as well as an invitation to attend the Eagle Play, parents and caregivers indicated that it would have been more effective if they had received this type of communication directly from the school.

"I think more communication from the school, most definitely. Besides, I know we get a school calendar, but with our busy lives, it's kind of 'Oh wow, that was today.' More communication from the school: 'We're going to be doing this.'"

—caregiver focus group participant

Second, to address the barriers focus group participants faced with regard to use of the Eagle Adventure recipes, some parents and caregivers suggested that program implementers should consider providing multiple recipes that call for the same ingredients (e.g., recipe ideas for family meals in addition to snacks). This might alleviate concerns related to wasting left over ingredients. Additionally, focus group participants reported difficulty thinking of ways to incorporate fruit and vegetables into their diet and their child's diet. To address this issue, one participant suggested "even, like, a Web site you could go to pull things off of for parents." Another added, "Parents could also contribute items if they have something, as far as a recipe." Additional focus group participants added to this idea by suggesting that, perhaps, some of the other nutrition education components could be posted on this Web site, such as a video of the play, since not all parents and caregivers could attend.

"I think if—like, on the recipe cards, I know the recipe cards were cute, and they were kid centered, but maybe some more practical like, like a stir-fry recipe."

—caregiver focus group participant

"Yeah, something you can incorporate with their other food, not this special thing you made just for that—something that you can do with the food."

—caregiver focus group participant

▲ Implementation time frame

When asked about barriers and facilitators of program implementation, both program staff members and principals noted schedule and timing conflicts related to standardized testing with which students in the third grade are involved during the spring semester. The timing of the intervention, specifically its overlap with the timing of standardized testing, was less than ideal and led to some schedule conflicts.

Additionally, the number of days between Eagle Adventure education contacts was also inconsistent, varying by school, as demonstrated in table II-5. The outcome coordinator noted in a report that the Eagle Adventure planning team could not control for the number of days between educational contacts because of the need to offer flexibility in terms of intervention timeline to gain entry into the schools and maintain a good rapport with school administrators and teachers. She also noted that this is yet another practical implication of implementing a school-based program and would not be unique to the implementation of the Eagle Adventure program for this demonstration project.

Program planners and implementers also indicated that the implementation timeline was too tight and that they would have preferred to allow for more time between each lesson. As previously described, the Eagle Adventure lessons were intended to be administered approximately 1–2 weeks apart to allow children in the intervention classrooms time to interact with parents and caregivers through the take-home materials before starting the next lesson. The actual number of days between Eagle Adventure education contacts was often a week or less, which might have contributed to parents and caregivers identifying time constraints as a barrier to their full utilization of the take-home materials. However, the Eagle Adventure team recognized that this challenge was, at least in part, a consequence of the need to work within the time constraints of the external evaluations and was not a flaw in the program's design.

Table II-5.— Number of Days Between Eagle Adventure Lessons by School

	PY to L1 Number of Days	L1 to L2 Number of Days	L2 to L3 Number of Days	L3 to L4 Number of Days
Allen	14	14	14	7
Francis	15	6	8	6
Homer	14	6	8	14
Roff	14	7	7	7
Vanoss	17	14	7	7

PY = Eagle Adventure Play; L1 = Lesson 1; L2 = Lesson 2; L3 = Lesson 3; L4 = Lesson 4

Source: Eagle Adventure program data provided by CNNS

Opportunities for Improvement. Two suggested revisions to the program’s implementation time frame were offered by the Eagle Adventure planners and implementers. First, they recommend implementing the program in the fall to avoid schedule conflicts related to standardized testing. Second, team members recommended extending the implementation time period to allow students, parents, and caregivers more time to interact and engage with one another between lessons through the program’s extensive offering of take-home materials and activities. Focus group participants echoed these suggestions for program improvement.

“I really think the fall, because it’s getting colder outside, it’s getting dark earlier, and maybe some of these activities should be activities to do inside—physical activities that you could find to do inside.”

—caregiver focus group participant

“But if they could have done it more toward the beginning of school, I think they would have gotten more out of it. I think he would have made better choices at the beginning of the school year instead of at the end.”

—caregiver focus group participant

Parents and caregivers offered some additional general modifications to the program’s implementation schedule, as well as other ideas that would help increase their use of the materials and activities. These included implementing the program with children at an even younger age (e.g., kindergarten) or implementing it over the entire school year.

Program implementers reported that principals would have liked to have had the lessons administered during consecutive weeks. Contrary to this belief, a comment made by one principal suggests that additional lessons administered over an extended implementation time period or alternate time frame for implementation would be ideal:

“The program could be longer to help reinforce the messages over the duration of the school year. If they [Eagle Adventure staff] stick with the current length of the program, then starting it earlier in the year to help avoid schedule conflicts with testing and extracurriculars would be good.”

—school principal

This suggestion was consistent with recommendations made by the Eagle Adventure team and some focus group participants.

▲ Varying levels of teacher engagement during the lessons

Direct educators of the Eagle Adventure program reported variation in classroom teachers' engagement in the lessons. Specifically, they noted that some classroom teachers helped with activities, while others just observed. Moreover, some classroom teachers left their classroom altogether during the Eagle Adventure lessons. Direct educators noted a difference in students' behavior when teachers were not present, and cited this as a challenge. When classroom teachers were not present, direct educators had to spend more time disciplining, which detracted from the time dedicated to administering the Eagle Adventure lesson. This variation in teacher engagement and subsequent student response was substantiated during onsite nutrition education observations conducted during the independent evaluation.

Opportunities for Improvement. During the demonstration project, teachers in the intervention classrooms were not required or specifically asked to remain in the classroom during the Eagle Adventure lesson. Eagle Adventure implementers suggested that encouraging teachers to remain in the classroom may be a means of improving program outcomes and help ensure consistency of healthful messages in the school environment. The Eagle Adventure team might also want to consider ways to encourage active versus passive participation by classroom teachers as this could positively influence children's engagement in the lessons and encourage teachers' reinforcement of the nutrition education messages.

▲ External factors reported to be inhibiting potential for behavior change

The barriers most commonly cited by parents and caregivers to achieving the goals of the Eagle Adventure program were the costs of buying fruits and vegetables and trying new recipes on a very limited budget and the time required to prepare these types of foods. A few participants pointed to barriers such as shopping for and identifying healthy foods in the supermarket as well as keeping foods fresh.

"It is expensive to feed a family of six fruits and vegetables and load your whole meal with that when I can do pastas and grains and potatoes and feed my whole family."

—caregiver focus group participant

"Yeah. I have, over the past several months, been trying to change the way I eat and what I fix and what I buy. I tell you what the hardest part—maybe part of it is cooking, but the shopping when you're trying to think health conscious to figure out what in the supermarket is okay to eat. It took me 2 hours the first time I had to go shopping to try to figure it out."

—caregiver focus group participant

Parents and caregivers also reported inconsistency in the messages the children are receiving in the school environment. Specifically, parents and caregivers in the focus groups mentioned the teachers' use of candy or junk food as an incentive and the availability of junk food and soda through vending machines, concession stands, and fundraising events at the school. Some parents and caregivers indicated that, given the choice, their children would continue to choose the less healthy options, a barrier to effecting positive nutrition-related behavior change.

"And sometimes they do have fundraisers that—and I know they need to make it fun for the kids, but they'll ask us to donate, like, a box of Little Debbie snacks so they can sell it for money."

—caregiver focus group participant

"We have Eagle Adventure to tell us to think about what we're putting in our mouth, and then at the end of the day, the teacher is like, 'Oh wow, you were really good today; have some Smarties.'"

—caregiver focus group participant

Opportunities for Improvement. To address parent and caregiver concerns related to the cost and time required to shop for healthy foods, the Eagle Adventure program planners and implementers could consider making some fairly straightforward additions or revisions to their current take-home materials. For example, the Eagle Adventure team could offer parents a tip sheet on how to shop for healthy foods or provide a few coordinated recipe ideas—that is, simple recipes for the preparation of snacks and meals that call for the same healthy ingredients. Other opportunities that could be effective, but would take more time and resources, include having an in-store demonstration on how to shop for healthy foods or parent and caregiver events that include tasting some of the healthy foods called for in the Eagle Adventure recipes.

The issue of mixed messages provided in the classroom setting could be allayed by requiring teachers to be present and more engaged in the Eagle Adventure lessons, as was previously suggested. Perhaps teachers who are exposed to the lessons would be less apt to offer unhealthy foods as incentives. Although more time and resource intensive, perhaps CNNS could add a lesson targeted to teachers to improve teachers' reinforcement of the nutrition messages in their classrooms. Addressing the issue of mixed messages provided in the general school setting (e.g., soda machines, junk food at concessions) is more challenging. However, the program could be effective over time in addressing these types of issues by empowering parents and caregivers to speak up about their concerns or to make changes themselves. For example, parents and caregivers in focus groups noted that they are largely responsible for operating school concessions; therefore, they may have some control over the items that are for sale during school events.

▲ **Additional staff support required in the classrooms**

Originally, the Eagle Adventure team had planned to use a total of two educators to deliver the nutrition education lessons—one educator per classroom. In order to implement the program in three grades across five schools in a relatively short time frame, the Team knew they would need to split the workload between two educators with each educator being assigned to two or three schools. However, once the intervention schools were formally recruited into the study and the timeline and schedule for implementation was closer to final, the Eagle Adventure team recognized that their limited time in the classroom, which was generally less than the planned 40 minutes, would necessitate the use of nutrition educator assistants who were primarily responsible for setting up, breaking down, and transporting nutrition education materials and props from one classroom to the next, distributing activity materials to children during the lesson, and keeping track of time in the classroom. The program managers and direct educators reported that this additional support, which represents a key deviation from their original implementation plan, allowed them to complete the lessons as planned in the abbreviated periods as well as to quickly transition from one classroom to another, as was required per their schedule in each school. The Eagle Adventure team strongly believes that this level of support would be needed if the program were replicated in the future under similar time constraints. Otherwise, the need for additional support would greatly depend on the direct educator's level of comfort with the curriculum.

Chapter III • Impact Evaluation Methods and Results

A. Conceptual Framework for the Impact Evaluation

To provide an integrative understanding of the impacts of the Eagle Adventure program, the analysis was guided by a conceptual framework that helped track the range of potential program effects. The framework enabled the evaluation of the effects of the Eagle Adventure program through the specification of secondary outcomes that link the intervention to the long-term outcome of the child's average daily at-home consumption of fruits and vegetables. The secondary outcomes capture, in greater detail, 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 framework presented in figure III-1 is adapted from Green and colleagues (1980). It has been used 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. In this 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 good nutrition. In this 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. In this evaluation, an example of a reinforcing factor is a parent offering fruits and vegetables as options for snacks or at dinner.

These mediating factors could affect dietary-related behaviors that include the following short-term outcomes: (1) child helped self to fruits or vegetables as snack, (2) daily variety of fruits and vegetables eaten by the child, and (3) child helped parent prepare a meal or snack. These short-term outcomes are directly related to lessons in the Eagle Adventure 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 or asks for fruits or vegetables as a snack. Changes in these short-term outcomes might, in turn, influence at-home consumption of fruits and vegetables.

Key Findings

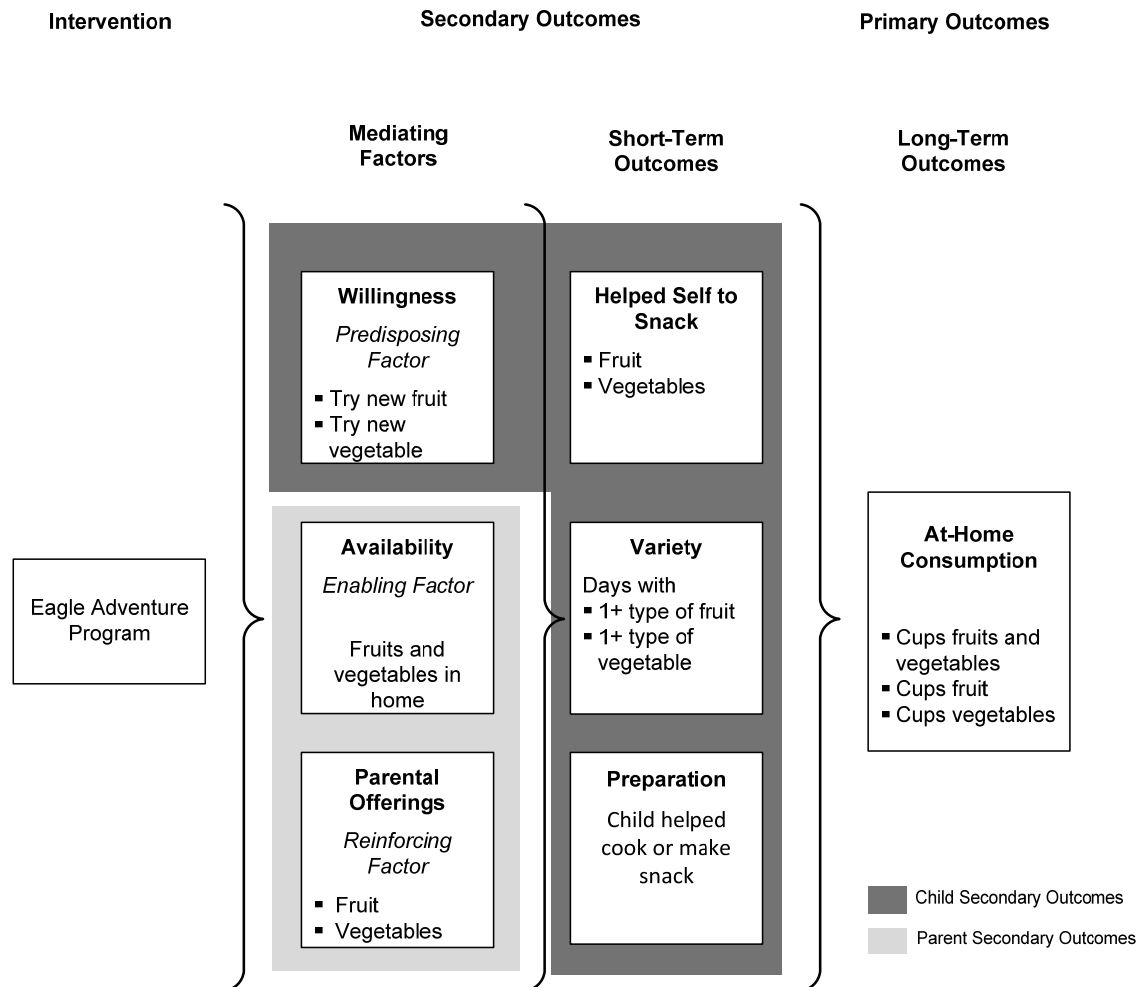
Primary Impacts

- The Eagle Adventure program had no statistically significant impact on children's daily at-home consumption of fruits and vegetables.

Secondary Impacts

- There was a significant increase in the number of days per week that children exposed to the Eagle Adventure program asked for or helped themselves to a vegetable as a snack.
- Trends suggest that children exposed to the Eagle Adventure program were more willing than other children to try new vegetables and that parents of exposed children reported greater availability of fruits and vegetables in the home.

Figure III-1.—Conceptual Framework for the Eagle Adventure Program Impact Evaluation



Adapted from: 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 program impacts, but it is not intended to represent a comprehensive logic model for the Eagle Adventure program. The program could also affect consumption through other pathways that are not reflected in this framework. Nonetheless, the use of this conceptual framework helps provide a fuller evaluation of the impacts of the Eagle Adventure program.

B. Methodology

1. Evaluation Design and Sample Selection

The Eagle Adventure program evaluation was designed to examine the implementation and impact of the program on children in the first, second, and third grades in schools in Pontotoc County, OK. The independent evaluators requested that Chickasaw Nation Nutrition Services (CNNS) provide the intervention to schools in another county to increase the number of schools available for the evaluation. Due to resource and staffing constraints, CNNS was unable to provide the intervention to schools outside of Pontotoc County. To provide the most rigorous design possible under this constraint, the independent

evaluators developed a quasi-experimental design and identified Bryan County, a neighboring county with similar percentages of Native American students and students receiving free and reduced-priced meals, for selection of comparison schools. Schools in Pontotoc County were matched to schools in Bryan County on percentage of Native American students, percentage of students receiving free and reduced-priced meals, and school size.

Sample size was estimated following commonly accepted evaluation practices (i.e., 80 percent statistical power and a type I error rate of 0.05 with a two-tailed test). Sample size estimation was based on observing a change in daily at-home consumption of fruits and vegetables combined of 0.30 standard deviation units or better, as specified by FNS. Estimates are based on a statistical model that assesses change across time between the intervention and comparison groups. This analysis indicated that to observe a net difference of 0.30 cups with five schools in each study condition, complete baseline and follow-up information was needed from 696 parents or caregivers. Appendix H provides additional information on the evaluation design and sample size calculations.

2. Primary and Secondary Outcome Measures

Exhibit III-1 lists the primary and secondary outcome measures for the impact evaluation of the Eagle Adventure program. This evaluation estimated the impact of the program on the primary outcome measure of the child’s average daily at-home consumption of fruits and vegetables as reported by their parents. It was hypothesized that children participating in the program would increase their average daily at-home consumption of fruits and vegetables by approximately 0.30 cups per day compared with children not participating in the program. The secondary outcome measures describe mediators and short-term outcomes that may influence at-home consumption of fruits and vegetables. The secondary outcome measures are grouped into two categories: (1) child’s other dietary behaviors and (2) parent behavior and household variables.

Exhibit III-1.— Primary and Secondary Outcome Measures for the Eagle Adventure Program Impact Evaluation

Primary outcomes: child’s dietary intake at home
Cups of fruits and vegetables consumed each day ^a
Cups of fruits consumed each day
Cups of vegetables consumed each day
Secondary outcomes: child’s other dietary behaviors 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
Number of days child helped self or requested fruit as snack during past week
Number of days child helped self or requested vegetables as snack during past week
Number of days child helped parent make snack or meal during past week
Willingness to try a new kind of fruit
Willingness to try a new kind of vegetable
Secondary outcomes: parent behavior and household variables
Availability of fruits and vegetables at home during past week
Number of times parent offered fruit for a snack or at dinner during past week
Number of times parent offered vegetables for a snack or at dinner during past week

^a This measure represents an index of dietary intake created by summing two survey items: one asks for the number of cups of fruit eaten in the home and the other asks for the number of cups of vegetables eaten in the home. Each survey item includes response options that range from “none” to “three or more cups” giving the index a range of “zero” to “six or more.”

3. Instrument Development and Testing

To develop the impact evaluation instruments for the baseline and follow-up surveys, the project team reviewed CNNS' application and the program curriculum and talked with the CNNS project staff to identify the primary and secondary outcome measures for the intervention. Existing instruments as compiled for the literature review conducted for this study (Altarum Institute and RTI International, 2009) were reviewed to identify those that address these outcomes and are feasible, appropriate for the target audience, reliable, valid, and sensitive to change.

In developing the impact instruments, the appropriateness of the existing instruments were assessed for collecting data on fruit and vegetable outcomes. Exhibit III-2 provides information on the study population, mode(s) of data collection, reliability, validity, and sensitivity to change for the instruments used to develop the questionnaire items on outcome measures. The majority of the 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.

For the primary outcome measures, child's dietary behavior, 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 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 day care so that they were reporting only on observed consumption behavior.

Two rounds of interviews with parents and caregivers of children from the targeted age groups were conducted to test and refine the instruments. The readability of the instruments was assessed using the Fry Test, which examines the proportion of syllables and sentence length and is a commonly used measure of reading level (Fry, 1968). Generally, the questions were at the fifth-grade reading level. Appendix C provides a copy of the final survey instruments and appendix D provides a copy of the supplemental survey materials.

4. Survey Administration Procedures and Response

To collect information on the program's impact, the project team administered a survey to parents and caregivers of children who participated in the evaluation before and after the intervention. To maximize the response rate for the survey, a multimodal survey approach was used. Working with the schools in the study, packets with information on the study were sent home with students. The survey was mailed to parents and caregivers who consented to participate in the study. Nonrespondents to the mail survey were contacted by telephone. For the follow-up survey, the survey questionnaire was mailed, with follow-ups by telephone to nonrespondents. Incentives of \$10 cash (baseline) and \$15 cash (follow-up survey) were provided for completing the survey. Appendix H provides additional information on interviewer training and the survey procedures.

At baseline, 58 percent of the intervention group participants (n = 411) and 53 percent of the comparison group participants (n = 445) consented to be in the study and completed the baseline survey. At follow-up, 344 participants in the intervention group and 379 participants in the comparison group completed the survey. The response rate for the follow-up survey was 84 percent for the intervention group and 85 percent for the comparison group. The required number of completed surveys was achieved for the intervention and the comparison groups.

Exhibit III-2.— Summary of Instruments Used to Develop Impact Instruments for the Eagle Adventure Impact Evaluation

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 by child each day ^a Child ate variety of fruits each day ^a Child ate variety of vegetables each day ^a	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 ($\alpha = 0.80$)	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
Willingness of child to try new fruits Willingness of child 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 ($p < 0.01$)
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 ($p < 0.05$)

^aThe questions were modified to ask the respondent (parent or other caregiver) to report on his or her child's consumption of fruits and vegetables.

5. Impact Analysis Procedures

The impact evaluation included repeated measures on individual respondents who are nested within schools, and schools that are nested in a study condition (i.e., intervention or comparison). When data are nested, responses within the same cluster tend to be correlated. If the correlated nature of the data is ignored in the specification of the model, it is likely to lead to inflated type I error rates. A series of hierarchical, or mixed-effects, regression models were developed to account for correlated responses by allowing for the inclusion of multiple sources of random variation.

General linear mixed models were used for continuous impact variables and generalized linear mixed models for dichotomous impact variables to evaluate program impacts while accounting for the clustering of students within schools. 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. Covariates in the model included child age, child sex, household size, whether the household had only one adult, respondent race and ethnicity, respondent age, and respondent sex. Missing data for covariates ranged from 1.2 to 1.8 percent of responses. Appendix H provides additional detail on the sampling models and link functions that describe the statistical models used to assess program outcomes and the structural models that detail the explanatory variables and the model coefficients.

Prior to conducting the impact analyses, 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.⁸ This was accomplished by fitting a logistic regression model that regressed completion status on variables that describe survey responders and their children (child's sex, child's age, respondent's age, respondent's sex, respondent's race and ethnicity, household size, and whether the household had only one adult). This analysis provided odds ratios that highlight any association between the descriptive characteristics of participants and the likelihood of providing data at follow-up.

C. Impact Analysis Results

This section describes the baseline demographic characteristics of parents and children who participated in the evaluation study and the baseline outcome measures; discusses the results of the attrition analysis; and presents the impact analysis results. A *p*-value of 0.05 was used for determining statistical significance.

1. Baseline Data

The baseline analysis included 856 parent respondents, 411 for the intervention group (parents of children attending five schools in Pontotoc County) and 445 for the comparison group (parents of children attending five schools in Bryan County). Table III-1 shows the baseline demographic characteristics for parent respondents and their children who participated in the evaluation study overall and by study condition.⁹ Children in the intervention and comparison groups were similar with regard to their sex and age. With the exception of age, the characteristics of parent respondents and their households were similar

⁸ Attrition includes individuals who did not complete the intervention (e.g., their child changed schools during the intervention) and individuals who did not complete the follow-up survey.

⁹ Appendix tables E-1 and E-2 provide the unadjusted baseline means by child's grade and by study condition, respectively.

Table III-1.— Baseline Demographic Characteristics for Parent Respondents and Their Children Who Participated in the Eagle Adventure Evaluation Study, by Condition

Characteristic	Overall (SE)	Intervention Group (SE)	Comparison Group (SE)	Difference
Child demographics				
Sex, % male	49.82 (1.71)	50.69 (1.70)	49.59 (1.92)	1.09
Age	8.27 (0.03)	8.31 (0.05)	8.23 (0.05)	0.08
Parent ^a /household demographics				
Respondent age, %				
18 to 34	53.37 (2.92)	47.66 (3.37)	58.80 (3.18)	-11.14*
35 to 44	35.89 (3.07)	40.85 (3.99)	31.34 (3.81)	9.50
45 or older	10.73 (1.68)	11.70 (2.56)	9.89 (2.45)	1.81
Respondent sex, % male	9.02 (1.10)	10.22 (1.73)	8.06 (1.63)	2.16
Respondent is Hispanic or Latino %	3.75 (0.81)	3.64 (1.27)	3.90 (1.20)	-0.26
Respondent race, %				
American Indian or Alaska Native	13.31 (2.21)	14.48 (3.30)	12.19 (3.16)	2.29
Asian ^d	0.12 (0.12)	0.11 (—)	0.00 (—)	0.11
Black or African American	1.53 (0.62)	0.82 (0.90)	2.16 (0.84)	-1.34
Native Hawaiian or other Pacific Islander	0.12 (0.12)	0.00 (0.17)	0.23 (0.16)	-0.23
White	73.86 (3.06)	70.49 (4.32)	76.94 (4.15)	-6.45
More than one race ^b	11.10 (1.41)	13.72 (1.88)	8.65 (1.77)	5.07
Size of household	4.52 (0.07)	4.65 (0.09)	4.41 (0.09)	0.24
Single-adult household, %	16.00 (1.25)	13.92 (1.46)	18.31 (1.51)	-4.40
School-provided food, %				
Received breakfast and lunch ^c	70.84 (4.63)	68.92 (6.91)	72.74 (6.80)	-3.82
Received lunch only ^c	21.46 (3.00)	23.11 (4.45)	19.87 (4.31)	3.23
Received breakfast and/or snacks only	3.82 (0.99)	3.97 (1.52)	3.68 (1.44)	0.29
Received no food from school	4.19 (1.11)	4.77 (1.66)	3.65 (1.58)	1.13
Number of respondents	856	411	445	
Number of schools	10	5	5	

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

^a Represents the parent/caregiver who completed the survey.

^b Includes respondents who selected more than one race category.

^c Some in this category also reported receiving school-provided snacks.

^d Only two respondents in the intervention group selected "Asian" as their race; therefore, no statistics were produced.

Note: Standard errors (SEs) and *t*-statistic used to test the null hypothesis of no difference between intervention and comparison groups were derived from model-based comparisons adjusted for clustering of students within schools.

Source: Parent Baseline Survey, data collected February–March 2010

for the intervention and comparison groups. The percentage of parent respondents between the ages of 18 and 34 was significantly higher for the comparison group compared with the intervention group (59 versus 48 percent, $p = 0.0427$). This difference was controlled for by including age, as well as other demographic characteristics, as covariates in the impact models. Respondents were predominately female (91 percent) and White (74 percent). Thirteen percent of respondents were American Indian or Alaska Native; this number is close to the 2009 estimated 16.7% Native American population for Pontotoc County¹⁰

Table E-5 in appendix E shows the baseline outcome measures overall and by grade, and table E-6 shows the baseline outcome measures by study condition.¹¹ At baseline, there were no statistically significant differences between the intervention group and the comparison group for any of the primary or secondary outcome measures.

For the primary outcome measure, the baseline mean daily at-home consumption of fruits and vegetables combined was 2.25 cups for the intervention group and 2.38 cups for the comparison group. The baseline mean daily at-home consumption of fruits was 1.08 cups for the intervention group and 1.18 cups for the comparison group, and the baseline mean daily at-home consumption of vegetables was 1.17 cups for the intervention group and 1.19 cups for the comparison group. When looking at these figures, it is important to bear in mind that the data are for at-home consumption and do not include fruits and vegetables consumed at school. As a point of reference, the U.S. Department of Agriculture (USDA) recommends that children aged 4 to 8 eat about 1.5 cups of vegetables each day and 1 to 1.5 cups of fruit each day, depending on the child's activity level (USDA, 2011). Accordingly, children may be meeting the guidelines for fruit but may not be meeting the guidelines for vegetables at baseline. Figures III-2 and III-3 show the baseline distribution of daily at-home consumption of fruits (figure III-2) and vegetables (figure III-3) for children participating in the evaluation by condition.

With regard to the secondary outcome measures, this study found the following at baseline for all study participants (intervention and comparison groups) (see table E-5 in appendix E):

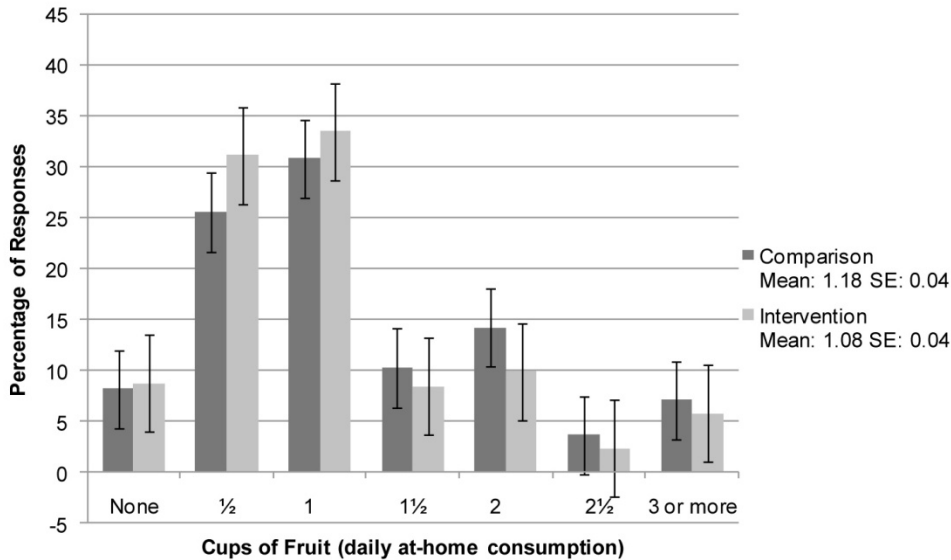
- Children ate more than one type of fruit each day about 3 days during the past week and more than one type of vegetable each day about 4 days during the past week.
- Children helped themselves to or requested fruit as a snack about 2.5 days during the past week and helped themselves to or requested vegetables as a snack less than day during the past week (0.87 days).
- Children helped their parent make snacks or prepare meals about 2 days during the past week.
- Fifty-nine percent of parents reported that their children are willing to try new fruits, and 36 percent of parents reported that their children are willing to try new vegetables.
- The at-home availability of eight fruits and vegetables (bananas, apples, grapes, peaches, oranges, carrots, celery, and raisins) was 4.72 (index score: 0–8).
- Parents offered fruit for a snack or at dinner about four times during the past week and offered vegetables for a snack or at dinner about six times during the past week.¹²

¹⁰ See U.S. Census Bureau Web site: www.quickfacts.census.gov/qfd/states/40/40123.html).

¹¹ Tables E-3 and E-4 in Appendix E provide the unadjusted baseline means and post-test means for the 344 intervention group participants and 379 comparison group participants who completed the baseline and follow-up surveys.

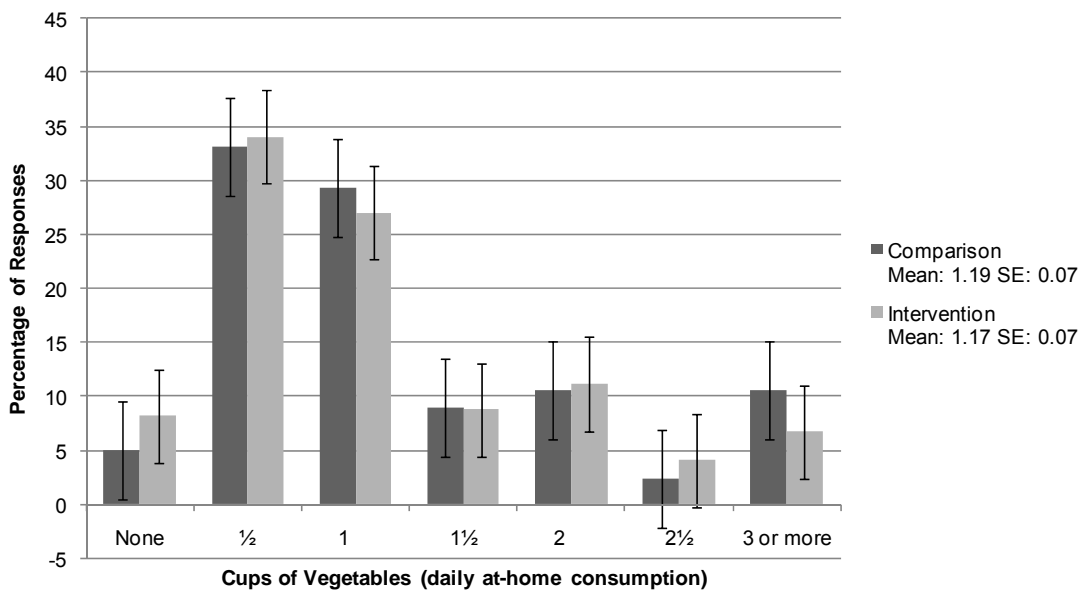
¹² Questions about parental offerings did not specifically exclude or collect information on fruit or vegetable juices. For additional information, see survey instrument in appendix C.

Figure III-2.—Baseline Distribution of Cups of Fruit Consumed at Home by Children Who Participated in the Eagle Adventure Program, by Condition



Source: Parent Baseline Survey, data collected February–March 2010

Figure III-3.—Baseline Distribution of Cups of Vegetables Consumed at Home by Children Who Participated in the Eagle Adventure Program, by Condition



Source: Parent Baseline Survey, data collected February–March 2010

2. Attrition Analysis

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. Table E-7 in appendix E presents the results of this analysis. Some differences were observed. Respondents with older children were less likely to complete the follow-up survey than respondents with younger children ($p = 0.0045$), and respondents with larger households were less likely to complete the follow-up survey than respondents with smaller households ($p = 0.0309$). Respondents in the oldest age group (45 or older) were 2.67 times more likely to complete the follow-up survey than individuals in the youngest age group (18–34; $p = 0.0199$). Female respondents were about one-third as likely to complete the follow-up survey as male respondents ($p = 0.0003$), perhaps because of the relative frequency of male and female respondents.

3. Child Primary Impact Results

Table III-2 shows the model-adjusted means at baseline and follow-up for the intervention and comparison groups and the estimated impact on number of combined cups of fruits and vegetables, cups of fruits, and cups of vegetables consumed at home. For the intervention group, between baseline and follow-up there was a small increase for cups of fruit along with a small decrease in cups of vegetables. Together, these changes led to a small overall increase in consumption of fruits and vegetables. For the comparison group, between baseline and follow-up, there was no change in cups of fruit and a small decrease for cups of vegetables. Together, this led to a small overall decrease in consumption of fruits and vegetables. The difference in the change between the intervention and comparison groups was not sufficient to warrant rejection of the null hypothesis of no effect. The overall increase of 0.07 cups of fruits and vegetables combined was below the anticipated minimum detectable difference of 0.30 cups. Thus, based on these results, there is no indication that the Eagle Adventure program had an impact on children's average daily at-home consumption of fruits and vegetables.

4. Child Secondary Impact Results

Table III-3 shows the model-adjusted means at baseline and follow-up for the intervention and comparison groups and the estimated impact on the child's other dietary behaviors. Parents in the intervention group reported an increase in the number of days per week that their children helped themselves or asked for vegetables as a snack (from 0.71 to 0.91 days), while parents in the comparison group reported a small decrease in this behavior over the same period (from 1.01 to 0.99 days). The observed impact results in an increase of 0.22 days per week in the rate of child-initiated vegetable snacking; alternatively this can be thought of as an approximate increase of one day per 5-week period ($p = 0.0441$).

Table III-2.— Child’s Dietary Intake: Primary Impacts for the Evaluation of the Eagle Adventure Program

Child’s Dietary Intake (daily at-home consumption)	Model-Adjusted Baseline Means (SE)		Model-Adjusted Follow-Up Means (SE)		Estimated Impact ^a (95% CI)	Wald Chi- Square p-value
	Intervention Group	Comparison Group	Intervention Group	Comparison Group		
Cups of fruits and vegetables	2.22 (0.07)	2.39 (0.07)	2.24 (0.07)	2.35 (0.07)	0.07 (-0.18, 0.32)	0.5599
Cups of fruits	1.08 (0.04)	1.18 (0.04)	1.15 (0.04)	1.18 (0.04)	0.07 (-0.07, 0.21)	0.2798
Cups of vegetables	1.16 (0.06)	1.20 (0.05)	1.11 (0.06)	1.16 (0.06)	-0.01 (-0.18, 0.16)	0.8486
Number of respondents	411	445	344	379		
Number of schools	5	5	5	5		

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

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

Source: Parent Survey, February–March 2010 (Baseline) and May–July 2010 (Follow-Up)

Table III-3.— Child’s Other Dietary Behaviors: Secondary Impacts for the Evaluation of the Eagle Adventure Program

Child’s Other Dietary Behaviors at Home ^a	Model-Adjusted Baseline Means (SE)		Model-Adjusted Follow-Up Means (SE)		Estimated Impact ^b (95% CI)	Wald Chi-Square <i>p</i> -value
	Intervention Group	Comparison Group	Intervention Group	Comparison Group		
Ate variety of fruits ^c	3.08 (0.10)	3.16 (0.09)	3.40 (0.11)	3.31 (0.10)	0.17 (−0.14, 0.49)	0.2427
Ate variety of vegetables ^c	4.11 (0.19)	4.28 (0.18)	3.92 (0.20)	4.11 (0.19)	−0.02 (−0.73, 0.68)	0.9453
Helped self/requested fruit as snack ^c	2.39 (0.12)	2.53 (0.12)	2.73 (0.13)	2.77 (0.12)	0.10 (−0.34, 0.55)	0.6037
Helped self/requested vegetable as snack ^c	0.71 (0.07)	1.01 (0.07)	0.91 (0.07)	0.99 (0.07)	0.22* (0.01, 0.43)	0.0441
Helped parent make snacks or meals ^c	2.26 (0.10)	2.28 (0.09)	2.41 (0.11)	2.38 (0.10)	0.06 (−0.3, 0.42)	0.7226
Willingness to try new fruits ^d	58.16 (0.03)	59.71 (0.03)	66.95 (0.03)	63.35 (0.03)	1.25 (0.78, 2.01)	0.3132
Willingness to try new vegetables ^d	33.54 (0.03)	39.48 (0.03)	44.31 (0.03)	42.18 (0.03)	1.41 (0.93, 2.14)	0.0925
Number of respondents	411	445	344	379		
Number of schools	5	5	5	5		

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

^a Based on continuous measures of the identified construct, unless otherwise indicated.

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

^c Reported as the number of days in the past week.

^d Dichotomous variable indicates the proportion responding yes.

Notes: General linear mixed models (SAS PROC MIXED) for continuous impact variables and generalized linear mixed models (SAS PROC GLIMMIX) for dichotomous impact variables used to evaluate the program impact while accounting for the clustering of students within schools. Covariates in the model included child age, child sex, number of people in household, whether household only had one adult, respondent race/ethnicity, respondent age, and respondent sex. SE = standard error. CI = confidence interval.

Source: Parent Survey, February–March 2010 (Baseline) and May–July 2010 (Follow-Up)

Additionally, parents in both the intervention and comparison groups reported an increase in their children's willingness to try new vegetables, with parents in the intervention group reporting a greater increase (10 percent) than parents in the comparison group (3 percent). The observed changes suggest an upward trend such that children in the intervention group were more likely than children in the comparison group to be willing to try new vegetables ($p = 0.0925$). There is no indication that the Eagle Adventure program had an impact on children's other dietary behaviors (eating a variety of fruits, eating a variety of vegetables, helping oneself to or requesting fruit as a snack, and willingness to try new fruits).

5. Parent Secondary Impact Results

Table III-4 shows the model-adjusted means at baseline and follow-up for the intervention and comparison groups and the estimated impact on parent offerings of fruits and vegetables and at-home availability of eight fruits and vegetables. Parents in the intervention group reported an increase in the availability of eight fruits and vegetables (4.78 to 5.00), while parents in the comparison group reported a decrease in this behavior over the same period (4.67 to 4.62). The observed change suggests a trend ($p = 0.0771$) toward increased availability of fruits and vegetables in the homes of children who participated in the Eagle Adventure program.

In summary, the Eagle Adventure program had no statistically significant impact on children's daily at-home consumption of fruits and vegetables. With regard to secondary impacts, there was a significant increase in the number of days per week that children exposed to the program asked for or helped themselves to a vegetable as a snack, and upward trends for willingness to try new vegetables and availability of fruits and vegetables in the home.

Table III-4.— Parent Offerings and Fruit and Vegetable Availability in Households: Secondary Impacts for the Evaluation of the Eagle Adventure Program

Parent Behavior and Household Variables	Model-Adjusted Baseline Means (SE)		Model-Adjusted Follow-Up Means (SE)		Estimated Impact (95% CI) ^a	Wald Chi-Square <i>p</i> -value
	Intervention Group	Comparison Group	Intervention Group	Comparison Group		
Availability of fruits and vegetables ^b	4.78 (0.08)	4.67 (0.08)	5.00 (0.09)	4.62 (0.08)	0.26 (-0.04, 0.55)	0.0771
Parent offered fruit for snack or dinner ^c	4.11 (0.17)	4.04 (0.16)	4.54 (0.18)	4.40 (0.17)	0.07 (-0.53, 0.66)	0.8042
Parent offered vegetables for snack or dinner ^c	5.96 (0.18)	6.18 (0.17)	6.10 (0.19)	6.15 (0.18)	0.17 (-0.48, 0.81)	0.5676
Number of respondents	411	445	344	379		
Number of schools	5	5	5	5		

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

^b Index score (0–8) based on reported household availability of eight fruits and vegetables.

^c Reported as the number of times in the past week (0-14).

Notes: Generalized linear mixed models (SAS PROC MIXED) used to evaluate the program impact while accounting for the clustering of students within schools. Covariates in the model included child age, child sex, number of people in household, whether household only had one adult, respondent race/ethnicity, respondent age, and respondent sex. SE = standard error. CI = confidence interval.

Source: Parent Survey, February–March 2010 (Baseline) and May–July 2010 (Follow-Up)

Chapter IV • Assessment of CNNS' Self-Evaluation

A. Methodology

Determining the effectiveness of the evaluation conducted by Chickasaw Nation Nutrition Services (CNNS) required a clear understanding of the planning, design, and implementation of the evaluation based on both objective and subjective measures. To the extent possible, the assessment was based on objective information such as the evaluation report prepared by CNNS. Qualitative methods were used to gather in-depth information as well as perspectives of key players in the evaluation (e.g., program administrators and the evaluation manager). Exhibit IV-1 describes the data sources used for the assessment, and appendix F provides copies of the forms and instruments used in the assessment.

The assessment of CNNS' evaluation of the Eagle Adventure program included a detailed description of their evaluation methodology, including management, staffing, and costs of the evaluation; an assessment of the quality of CNNS' evaluation, including strengths and weaknesses; a comparison of CNNS' study design and results with the Food and Nutrition Service (FNS) independent evaluation; and an assessment of lessons learned based on the quality assessment, cost analysis, and reported factors affecting evaluation implementation. Appendix I provides additional information on the methodology for the assessment of CNNS' self-evaluation.

Key Findings

- The CNNS evaluation employed a one-group pre-post test design with surveys of students participating in the intervention to measure the impact of the Eagle Adventure program.
- Strengths of CNNS' evaluation included the data collection methodology, limited participant attrition, and few missing data for the impact analysis.
- The weaknesses included a poor comparison strategy, an inadequate sampling approach, and the data analyses did not account for the clustering of individuals within schools.
- Both the CNNS self-evaluation and the independent evaluation support the conclusion that the Eagle Adventure program led to some improvements in children's intentions to select more fruits and vegetables.

B. Description of CNNS' Self-Evaluation

This section describes the methodology used by CNNS to evaluate the Eagle Adventure program and provides information on the management, staffing, and costs of the CNNS evaluation. This description is based on CNNS' demonstration project application (CNNS, 2008) and its evaluation report (CNNS, 2010).

Exhibit IV-1.—Description and Use of Data Sources for the Assessment of CNNS’ Self-Evaluation

Data Source	Description and Use
CNNS’ application	The application to request funding as a demonstration project provided information on the proposed evaluation procedures. The study team abstracted information from CNNS’ application to describe their evaluation approach and identify any differences between their planned and actual evaluation approach..
Evaluation review form	This form included eight evaluation components (e.g., viable comparison strategy and data analysis), each of which was scored on a 1 to 5 scale. The study team completed the form using information from CNNS’ application and evaluation report and additional information obtained in the key informant interviews conducted following the evaluation. The completed review form was used to prepare a descriptive assessment of the quality of CNNS’ evaluation that identified the strengths and weaknesses of the evaluation and detailed areas for improvement.
Evaluation cost form	This form, completed by CNNS, documented the resources used and costs incurred by CNNS to evaluate the Eagle Adventure program. The completed form and the findings from the key informant interviews were used by the study team to prepare a descriptive assessment of the cost of conducting the evaluation.
CNNS’ evaluation report	The study team provided CNNS 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 CNNS’ evaluation and to compare CNNS’ study design and results with the FNS independent evaluation.
Key informant interviews	Using structured interview guides, the study team conducted in-depth interviews with key informants, including the program manager and the outcomes coordinator, before and after the evaluation was conducted. The findings from these interviews informed all aspects of the assessment of CNNS’ self-evaluation, in particular, the assessment of the management of the evaluation and lessons learned from conducting the evaluation.

1. Research Objectives and Hypotheses and Outcome Measures

The Eagle Adventure program was a pilot program tailored to the specific nutrition and health concerns of SNAP-Ed eligible Native American families living in the Chickasaw Nation boundaries. The long-term goal of the Eagle Adventure program was to prevent diabetes in Native American families using a culturally appropriate intervention strategy based on formative research conducted with SNAP-Ed-eligible mothers. The short-term goals were to increase consumption of fruits and vegetables as well as to encourage balanced calorie intake with energy expenditure in Native American children enrolled in the first through third grades in Pontotoc County, OK, where 50 percent or more of the children receive free or reduced-price meals.

The Eagle Adventure evaluation included the following project-level objectives:

- After participating in the Eagle Adventure program, students will increase their intent to choose fruits and vegetables as demonstrated by a significant increase in self-reported food choice scores.

- After participating in the Eagle Adventure program, students will increase their consumption of fruits and vegetables as demonstrated by a significant increase in self-reported food behavior scores.
- After participating in the Eagle Adventure program, students will identify fruits and vegetables as healthful snack options as demonstrated by a significant increase in self-reported food knowledge scores.
- After participating in the Eagle Adventure Program, children will increase physical activity behaviors as demonstrated by a significant increase in the physical activity choice scale.
- After participating in the Eagle Adventure Program, children will identify healthful physical activities as demonstrated by a significant increase in the physical activity knowledge scale.

The CNNS evaluation included outcome measures for physical activity; however, the FNS independent assessment focused on evaluating the nutritional outcome measures only.

2. Research Design and Sample Selection

CNNS' application specified the primary audience for the program as low-income, Native American children in pre-kindergarten through third grade attending schools in and around Pontotoc County, OK. The secondary audience included mothers of these children. CNNS subsequently changed the scope of the intervention to include only children in the first through third grades and their mothers. The CNNS evaluation employed a convenience sample of students attending schools in Pontotoc County, OK. CNNS selected the schools to include in the intervention based on established ties and willingness to participate in the program as well as the schools' ability to meet the inclusion criteria: (1) 50 percent or more of students receive free and reduced-price lunches, and (2) the Native American student population exceeds the State average. A total of 704 elementary school students from five schools were eligible to participate in the study.

CNNS employed a one-group pre-post test design for the evaluation of the Eagle Adventure program. No control or comparison group data were collected in the evaluation. CNNS did not conduct a power analysis prior to the intervention. The assumed goal was to survey all students who participated in the Eagle Adventure program. There was no specific information on the anticipated size of the program's effect.

3. Survey Administration Procedures and Response

The Perry et al. (2002) questionnaire for children in first through third grades was adapted to measure food choice and knowledge, and questions from Jackson (2004) were adapted to measure physical activity and choice behaviors. CNNS pretested the instrument with 39 first-grade students. The pre-intervention survey was administered 11 to 14 days before the intervention; the post-intervention survey was administered 11 to 15 days after the intervention was completed. The specific dates for data collection varied to accommodate minor variations in school scheduling.

At baseline, 622 surveys were collected; of these, 44 did not provide data on key outcome variables, yielding 578 completed pre-intervention surveys. At follow-up, 640 surveys were collected; of these, 27 did not provide data on key outcome variables, and 114 could not be matched to a valid pre-intervention survey, resulting in a total sample size of 499 for the analysis. Table IV-1 provides information on survey response rates at pre- and post-intervention.

Table IV-1.— Pre- and Post-survey Response Rates for the CNNS Self-Evaluation

	Total Number Planned	Total Number Received	Number Eliminated due to Identifiers ^a	Number Eliminated due to Item Nonresponse ^b	Number of Usable Surveys	Raw Response Rate (%) ^c	Usable Response Rate (%) ^d
Pre-survey	704	622	1	43	578	88.4%	82.1%
	Total Number Planned	Total Number Received	Number Eliminated due to Item Nonresponse	Number Received that Could be Matched with Pretest	Number of Usable Surveys ^e	Raw Response Rate (%)	Usable Response Rate (%)
Post-survey	704	640	27	526	499	90.1%	70.1%

^a Missing participant identifier.

^b All pre-test surveys with any incomplete item responses.

^c Raw response rate not accounting for item nonresponse or missing identifiers.

^d Corrected rate calculated after removing unusable surveys.

^e Number of usable post-test surveys calculated as number of usable pre-test surveys minus number of post-test surveys that could not be matched with pre-test surveys minus the number of post-test surveys missing responses.

Source: CNNS Evaluation Report, 2010

4. Analysis Procedures

Primary program outcomes were assessed using simple analysis of variance (ANOVA)-based approaches. Analyses consisted of unadjusted paired t-tests examining the pre- to post-intervention changes. The use of paired t-tests reduces random variation by employing baseline and follow-up data to construct a gain score that summarizes the change in the measured outcome over a given period. To the extent that the measured outcome is relatively stable, this can reduce extraneous variation and improve the precision of the analysis. CNNS reported findings as statistically significant at the $p \leq 0.05$ criterion and as approaching significance within the range of $0.05 < p < 0.10$.

5. Management, Staffing, and Costs of the Evaluation

The Eagle Adventure evaluation team was comprised of the outcomes coordinator, an evaluation coordinator, and the direct educators whose respective roles were described in Chapter II. The Eagle Adventure program manager provided review and assistance for the implementation of the evaluation at the programmatic level.

Table IV-2 shows the actual expenditures CNNS reported as the costs required to conduct their self-evaluation—a total of \$100,312—with all of the direct costs attributed to staff salaries, noncapital equipment or supplies, and travel. Appendix B includes the detailed budget tables CNNS provided for this evaluation, including a breakout of non-Federal and Federal funding for each budget category.

Table IV-2.— Summary of CNNS Costs for Evaluation of Eagle Adventure (Fed FY 2010)

Budget Category	Expenditures	Percentage of Total Costs
Salary and benefits	\$64,549.12	64.3
Noncapital equipment and supplies	\$16,227.64	16.2
Travel	\$2,649.93	2.6
Total Direct Costs	\$83,426.69	83.1
Indirect costs	\$16,885.56	16.8
Total	\$100,312.25	100

Source: Cost data provided by CNNS (see completed "Resource and expense tracking form" in appendix B)

- **Salary and benefits.** This expense includes the salaries or hourly wages for the following implementing agency staff who supported the CNNS evaluation of the Eagle Adventure program directly or administratively:

Position	Number of FTEs
Outcomes coordinator	0.20
Program manager	0.012
Evaluation coordinator	0.06
<u>Direct educators and evaluators</u>	<u>0.17</u>
Total	0.442

- **Noncapital equipment and supplies.** This expense includes costs associated with printing and labeling, using computer equipment, and purchasing folders, office supplies, and student reinforcements.
- **Travel.** The program travel expenditures include the costs for CNNS staff to travel to and from the five intervention schools to administer the pre- and post-intervention surveys as well as for any quality control and monitoring activities that took place.

C. Assessment of the Quality of CNNS' Self-Evaluation

Although FNS guidelines encourage all States to evaluate the effectiveness of their SNAP-Ed interventions, measuring and identifying the results of nutrition education in terms of concrete changes to dietary behaviors is a challenge for both FNS and its State and local partners. In FY 2004, 74 percent of SNAP-Ed implementing agencies reported that they conducted outcome evaluations on at least some aspects of services. However, their evaluations often did not distinguish between activity monitoring and outcome evaluations (USDA FNS, 2006). Based on interviews with staff from 17 implementing agencies, the focus of their evaluations was to some extent on behavior change among participants, but to a much greater extent on program use (e.g., quantifying the number of events held, the number of participants reached, and the number of contacts per participant). Forty-three percent of implementing agencies surveyed in 2004 indicated that significant barriers to the conduct of successful evaluations included a lack of funds and expertise on the part of their local project staff and subcontractors (USDA FNS, 2006).

To compare findings from an intervention's self-evaluation with a rigorous independent evaluation, a scoring tool based on the one used by the Center for Substance Abuse Prevention in development of the

National Registry of Evidence-based Programs and Practices (NREPP) database (see <http://nrepp.samhsa.gov/> for additional information) was adapted for use in this study. The evaluation review form, provided in appendix F, includes eight evaluation components and requires a reviewer to assign a numerical score ranging from one to five for each component. Reviewers were provided the following anchors for scoring:

- 1 = missing or so poorly described that its value to the evaluation cannot be determined;
- 2 = is inappropriate, misunderstood, or misrepresented in such a way that it cannot contribute to an effective evaluation of the program. The actions or materials reported are not appropriate for the evaluation effort proposed;
- 3 = shows a general understanding of its role in the evaluation. However, key details have been overlooked or not thoroughly reported. Needs moderate revision to be considered acceptable;
- 4 = is appropriate for the evaluation, technically correct, and is described well enough to show a general understanding of its role in the overall evaluation. Evidence shows that it will or has been implemented properly, but minor details may be missing or unclear; and
- 5 = is appropriate for the program being evaluated and is presented in a way that shows 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 in a way that makes them unlikely to contribute to 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.

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. Table IV-3 provides the results of the completed review form.

Table IV-3.— Assessment Scores for CNNS’ Self-Evaluation

Evaluation Component^a	Score
Research objectives and hypotheses	3
Viable comparison strategy	2
Sampling size and strategy	2
Outcome measures	3
Data collection	4
Data analysis	2
Attrition/nonresponse between pre- and post-surveys	4
Missing data (i.e., survey item nonresponse)	5

^a Appendix I provides a description of the criteria used to assess each evaluation component.

The strengths and weaknesses of CNNS' evaluation are summarized in exhibit IV-2. The strengths of CNNS' evaluation included the data collection methodology, limited participant attrition, and few missing data for the analysis. Weaknesses included a poor comparison strategy, an inadequate sampling approach, and data analyses that were not appropriate for the given evaluation design. Additional information on the weaknesses, and a discussion on why these weaknesses are a concern, is provided in section D, which compares the CNNS evaluation methodology with that of the independent evaluation.

Exhibit IV-2.—Summary of Strengths and Weaknesses of CNNS' Self-Evaluation

Strengths

- ▲ Data collection procedures included well-trained field staff.
- ▲ Participant attrition was within expected levels.
- ▲ Very few data were missing (incomplete survey or items) for the analysis.

Weaknesses

- ▲ The lack of a comparison or control group limited CNNS' ability to eliminate numerous validity threats.
 - ▲ A power analysis was not conducted. The assumed goal was to survey all students who participated in the intervention. There was no specific information on the anticipated size of the program's effect.
 - ▲ The research objectives and hypotheses were not stated in quantifiable terms, making it difficult to assess whether program goals and objectives were realistic and how well they were achieved.
 - ▲ The data analysis did not take into account the complexity of the evaluation design, that is, the clustering of individuals within schools. Thus, the standard errors are likely to be underestimated, and reported p -values may overestimate significance.
-

D. Comparison of Evaluation Methods and Results for the CNNS and the Independent Evaluations

Exhibit IV-3 compares the study designs for the CNNS' self-evaluation and the independent evaluation of the Eagle Adventure program. The first row compares and contrasts the comparison strategy for the two evaluations. The CNNS evaluation employed a one-group pre–post test design. This design has no control or comparison group data. Instead, data are collected on the same measures from the same individuals at baseline and follow-up, and changes in the reported outcomes are assumed to be the result of the intervention. This is generally considered a weak evaluation design because it does not allow evaluators to eliminate the possibility that events beyond the program influenced the measured outcomes. Without a good comparison, observed changes may reflect natural changes over time (maturation), events that occurred before the intervention (history), or factors related to measurement (testing effects). In contrast, the independent evaluation design adds a comparison group to the simple pre- and post-test design described above. The design is from the family of quasi-experimental approaches and the comparison group is called “nonequivalent” to reflect the fact that it was not developed through a process of random assignment.

The designs for both the CNNS and independent evaluations included very few independent units: 5 in the CNNS design and 10 in the design for the independent evaluation. With few independent units, the opportunity to examine and potentially control for selection is limited. If, for example, schools or counties in one of the two conditions have unknown or unaccounted-for structural characteristics that affect dietary behavior (e.g., school districts that participate in farm-to-school programs), these effects cannot be separated out from program outcomes and are inseparable from estimated intervention impacts.

Exhibit IV-3.—Comparison of Study Designs for the CNNS and the Independent Evaluations

Study Design Characteristics	CNNS Evaluation	Independent Evaluation
Comparison strategy	Observational one-group design	Quasi-experimental design with matched comparison group selected from a demographically similar county
Data collection	Classroom survey of students facilitated by nutrition educators	Mail survey of parents/caregivers, with follow-up by phone for nonrespondents
Sample size estimation	Power analysis was not conducted to determine required sample size	Sample size determined <i>a priori</i> based on expected program impact and characteristics of the research design
Data analysis	ANOVA-based paired t-test	Mixed-model regressions using maximum likelihood estimation
Impact estimate	Pre- and post-test change among intervention group	Pre- and post-test change between intervention and comparison groups
Primary outcome measures	Intentions to eat fruits and vegetables Consumption of fruits and vegetables Identification of fruits and vegetables as healthy snacks	Parent or caregiver report of child's fruit and vegetable intake in the home

The second row of exhibit IV-3 compares and contrasts the data collection methods for the two evaluations. The CNNS evaluation collected data from the first- through third-grade students involved in the intervention, while the independent evaluation collected data from their parents and caregivers. The latter data collection focused on parents' and caregivers' recollections of their children's at-home dietary intake and diet-related behaviors. Accordingly, both evaluations include children's dietary intake as a primary outcome, though each sought information on this behavior from different sources. Because the sources of the data are different for the two evaluations it is not appropriate to make comparisons. The literature on collecting information on children's dietary behaviors identifies strengths and weaknesses for each approach, so currently there is no evidence that one approach is preferable for evaluation purposes.

The third row of exhibit IV-3 compares and contrasts the sample size estimation procedures. The independent evaluation conducted *a priori* sample size estimation that specified schools as the unit of analysis (i.e., level of independence) and included data from individuals nested within schools. In contrast, CNNS did not conduct *a priori* sample size estimation, though it was noted that they expected 704 students would participate in the Eagle Adventure program. *A priori* sample size estimation takes into account the assumed effect size (i.e., program impact) and known or assumed information about the variation in the measurement to determine the number of individuals that would be needed to determine that an observed change occurred due to the intervention and not due to chance or measurement error. The *a priori* sample size estimation of the independent evaluation was based on the need to detect a net change of 0.30 cups of fruit and vegetable intake, accounted for an intraclass correlation coefficient of 0.05, and was conditioned on expectations regarding compliance and participation rates. It was determined that obtaining a minimum of 80% statistical power to detect a net change of 0.30 cups of fruit and vegetable would require a study with five schools in each of two conditions and an average of 70 complete pre-intervention/post-intervention surveys. Without some understanding of the way these factors interact, it is difficult to determine whether failure to achieve statistically significant findings is

due to evaluation design characteristics or programmatic factors. The independent evaluation completed the required number of surveys based on the power analysis; however, the CNNS evaluation was unable to complete surveys with all students; thus, the potential for nonresponse bias exists.

The fourth, fifth, and sixth rows of exhibit IV-3 compare and contrast the data analysis procedures, the impact estimates, and primary outcome measures of the two evaluations. The data analyses of the independent evaluation account for the nesting of individual-level observations. When analyses are conducted on data from respondents who are embedded (i.e., nested) in predefined social units (such as schools), there is a strong potential that their responses to survey items could be similar because of shared experiences or similar sociodemographics. This similarity reflects the fact that individuals do not aggregate in social units randomly. Students within the same schools may have similar family economics or shared values, and they certainly have shared experiences that are unique to the school's setting (e.g., teachers). This similarity results in correlated observations that, if ignored, will likely lead to underestimated standard errors and falsely inflated test statistics (Zucker, 1990; Murray et al., 1996; Murray, 1998). By specifying schools as the between-subjects factor and employing a mixed modeling approach, one can account for potential correlation among individuals within the same school and provide *p*-values from tests of program impacts that are accurate. In contrast, the analyses provided by CNNS specified students as the unit of analysis and made no adjustments to account for correlated data at the school level; thus, the *p*-values reported in their evaluation are likely to be inflated.

Table IV-4 presents the results of the CNNS evaluation. Limitations in the CNNS data analysis strategy previously discussed should be considered when reviewing these results. CNNS examined changes in food choice, food knowledge, and food behavior. For each construct, a scale was created using responses to multiple questions in the survey. According to CNNS,

“Pre-post scores for the food choice scale were significantly different with improvements in food choices scores being noted at post-intervention. Pre-post difference in food behavior scores approached significance ($p = 0.06$) indicating a slight improvement in intake of healthful foods at post intervention. There was not a significant difference in pre- and post-nutrition knowledge scores. It should be noted that the mean pre-intervention knowledge scores ($7.94 + 0.02$) were near the maximum knowledge score possible (8.00) and little room was available for improvement. Students entered into the intervention with high knowledge of healthy foods” (CNNS Evaluation Report, 2010).

Estimated impacts from the independent evaluation provide some support for these findings. For example, the independent evaluation found that parents and caregivers of children in the intervention group reported that their children increased asking for or helping themselves to vegetables as a snack from baseline to follow-up significantly more than parents and caregivers of children in the comparison group ($p = 0.044$).

Differences in the results of the two evaluations may be due to differences in instrumentation. The CNNS instrument asked students about specific fruits and vegetables consumed in the previous 24 hours, while the instrument used for the independent evaluation asked parents about their children's fruit and vegetable consumption in general without indicating specific fruits and vegetables. The CNNS instrument was pre-tested on a group of 39 first graders to appraise student comprehension of food and physical activity concepts as well as to assess the survey implementation process. The internal consistency for scales was acceptable (reliability coefficients not reported) with the exception of the food behavior scale and physical activity behavior scale when tested with this small group of first graders.

Table IV-4.— Differences between Pre- and Post-survey Scores Reported in the CNNS Evaluation of the Eagle Adventure Program

	Intervention		<i>t</i>	<i>p</i>
	Pre	Post		
Food Choice Scale (FCS)^a				
Mean (SE)	10.47 (0.07)	10.77 (0.07)	-4.34	<0.001
Food Knowledge Scale (FKS)^b				
Mean (SE)	7.94 (0.02)	7.92 (0.02)	1.14	0.254
Food Behavior Scale (FBS)^c				
Mean (SE)	8.24 (0.07)	8.37 (0.08)	-1.89	0.059
Sample Size	499	499		

^aIntent to choose healthful food options was measured by responses to four questions that asked students to circle which food they would choose when given a choice between a healthful and less healthful option and two questions that asked whether they would like to consume more fruits and vegetables. FCS scores could range from 6 to 12; a low score indicates a poor quality choice and a high score indicates a better choice.

^bFood knowledge was measured by responses to four questions that asked students to identify from a pair which food was better for their body. FKS scores could range from 4 to 8; a low score indicates low food knowledge and a high score indicates a high level of food knowledge.

^cFood behavior was measured by responses to six questions that asked students to identify whether they had eaten specified fruits or vegetables in the previous 24 hours. FBS scores could range from 6 to 12; a low score indicates less optimal food behaviors and a high score indicates improved food behaviors.

Source: CNNS Evaluation Report, 2010.

The independent evaluation used a modified and pretested version of the Fruit and Vegetable Checklist (Townsend et al., 2003), which has been shown to be a reliable and valid measure of fruit and vegetable consumption in low-income populations. Furthermore, the instrument for the independent evaluation focused on fruit and vegetable consumption at home because the survey responses were based on parental reports, whereas the CNNS instrument did not include this restriction because the child completed the survey. Either of these factors could contribute to the differences in the results for the two evaluations.

E. Lessons Learned

1. Facilitators and Challenges to Implementation of Evaluation as Planned

Both the CNNS program manager and outcomes coordinator emphasized the importance of conducting program evaluation. At the same time, both identified several critical challenges that they have faced in implementing such an evaluation, particularly because it is youth- and school-based. The most commonly reported facilitators and challenges are described below.

a. Facilitators

▲ Training was high quality and effective, ensuring consistent data collection

The program manager was quick to point out 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 evaluator was involved at the early stages and planning of implementation

The outcomes coordinator emphasized the importance of involving the program evaluator, even during the early planning stages of program implementation, and of being flexible. Specifically, she indicated that program development and program evaluation could not be developed separately because of their obvious overlap. She indicated that the evaluation needed to be high quality and useful but also practical in terms of program implementation.

b. Challenges

▲ Time required to conduct the evaluation

Coming from a programmatic perspective, the program manager indicated that her biggest concern with conducting an evaluation or ongoing evaluations of the Eagle Adventure program is the time required to do so—time spent tracking children between pre- and post-surveys as well as time balancing nutrition education in the classroom versus time spent on research purposes. Classroom time for the provision of nutrition education lessons is limited in a school setting. Perhaps for this reason, the program manager indicated that while she understands the importance of conducting program evaluation, it is critical that the time spent on evaluation does not substantially reduce the time spent providing nutrition education.

▲ Minimal control over the design

The outcomes coordinator noted that the greatest challenge with implementing an evaluation in the school setting is the limited control that evaluators have over its design. She noted the importance of maintaining rapport with the schools and, subsequently, the need to be flexible with regard to scheduling class time for this activity. However, despite concerns related to the timing of pre- and post-survey administration, process information provided by CNNS indicates that the team was generally able to administer the surveys as planned—the same number of days from the start and completion of the intervention in each of the schools.

▲ Challenges related to evaluating children

The outcomes coordinator acknowledged that although there are challenges in evaluating children, the team opted for an in-class design, as it was most practical from a programmatic perspective. The outcomes coordinator specifically noted the potential for positive response bias when evaluating children. Interestingly, the program manager made the same comment, based on her observation of the pre- and post-survey administration in a number of classrooms. She thought that the children were sometimes answering questions the way they thought the direct educator or classroom teacher wanted them to answer. She also said that some of the classroom teachers who observed their classrooms during the administration of the surveys made similar remarks.

2. Intended Use of Evaluation Results

Both the program manager and the outcomes coordinator indicated that they have already shared a great deal of information about their evaluation results with the Chickasaw Nation. In addition, they provided the following list of additional stakeholders and partners with which they have shared or plan to share their results:

- Chickasaw Nation leadership;
- The Oklahoma Racial and Ethnic Approaches to Community Health (REACH) program to expand Eagle Adventure to other tribes in the State;
- Oklahoma Partnerships Building Health Communities; and

- The Eagle Book workgroup, per a request from the Center for Disease Control and Prevention’s Division of Diabetes Translation’s Native Diabetes Wellness.

Additionally, the key informants also indicated that they plan to share this information more broadly by submitting abstracts to present findings at professional conferences, submitting manuscripts to peer-reviewed journals, and providing Chickasaw Nation radio announcements.

3. CNNS’ Future Evaluation Plans

Again, both the program manager and the outcomes coordinator emphasized the importance of conducting program evaluation, recognizing that it is critical to ensuring that they can continue to improve and implement the Eagle Adventure program. For this reason, they plan to continue evaluating the program and modifying it as necessary based on their findings.

To address some of the challenges noted by key informants, the outcomes coordinator identified several ways in which they plan to modify or enhance the evaluation of Eagle Adventure:

- **Plan to include a qualitative component.** While they were able to observe some nutrition education lessons, they would like to learn about satisfaction with the program from the teacher and parent or caregiver perspective.
- **Revising youth survey.** The outcomes coordinator also reported that they have removed the behavior questions from their youth surveys and are moving more toward intent- and social-desirability-related questions, because children have less control over fruit and vegetable choices than they do about physical activity. CNNS is also considering adding a qualitative component to the survey to learn about participant satisfaction with the program.
- **Plan to add a brief parent and caregiver post-survey.** The outcomes coordinator reported that they have considered moving from their current youth survey to a parent and caregiver survey. However, she recognized that response rates would be a challenge, especially since they would not be able to offer an incentive. Thus, rather than eliminating the youth component, they plan to add a four-question parent and caregiver post-survey, which includes retrospective questions on children’s behaviors prior to the Eagle Adventure to better understand children’s nutrition-related behavior at home.

Moreover, CNNS plans to maintain those aspects of the evaluation process that worked well (e.g., data collector training, the outcomes coordinator’s involvement in program implementation planning) and try to limit the amount of class time spent on evaluation, rather than on nutrition education, without compromising the quality of the evaluation.

4. Suggestions for Improving Evaluations

A well-designed impact evaluation accomplishes several tasks. It permits the investigator to 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. No single design can address every potential concern. Some approaches are commonly viewed as preferable. Based on the assessment of CNNS’ evaluation of the Eagle Adventure program, this study identified the following as future opportunities for improved evaluation within the financial and personnel constraints that are typical of SNAP-Ed programs.

▲ **Use designs that can reduce plausible alternative explanations of program impact**

As previously described, CNNS used an uncontrolled pre-test/post-test design to determine whether participation in the Eagle Adventure program led to an increase in consumption of fruits and vegetables, other dietary behaviors, and physical activity. In this type of design, a person serves as his/her own comparison, and the logic of the design assumes that any change from pre-test to post-test is due to the intervention. This design can be useful when it is difficult for factors beyond the intervention to affect the outcome of interest, when a person's responses can be assumed to be relatively stable over time, and when the evaluation includes a very large sample. Absent these conditions, there may be many plausible alternative explanations for measured changes (or differences) in program outcomes.

The CNNS evaluation design would have been strengthened by steps that would have allowed the investigators to rule out plausible alternative explanations such as maturation (i.e., as children age, they naturally change and these changes may either mask or appear as program-related changes), selection (i.e., if factors such as education or socioeconomic status influence treatment group assignment *and* these factors are associated with an outcome such as dietary quality, it is possible that the selection process itself may influence the size of the program's effects), and secular trends (i.e., the importance of a healthy diet is well known and highly publicized). Program participants may be changing for reasons related to community factors (e.g., the introduction of farmer's markets) or the influence of media campaigns that emulate the program's effects). While randomization is typically seen as the best solution for these problems, other potential solutions include the following:

- **Use of nonrandomized comparison groups as was done in the independent evaluation.**
- **Collection of additional waves of data for trend and interrupted time-series analyses.** In this approach, a string of observations is interrupted by the implementation of an intervention, and the investigator can assess whether this phenomenon altered the slope (change over time) in the outcome of interest. For example, three rounds of data collection are conducted before the intervention, and three rounds of data collection are conducted after the intervention from the same cohort. This design expresses change as a function of time, making it more difficult to construct plausible alternative explanations for changes in the outcome of interest. Contemporaneous measurement of environmental factors such as media campaigns should also be considered. The approach can be particularly effective when repeated implementations of the intervention are possible; this allows the investigator to monitor the rise and fall of primary outcomes associated with the intervention.
- **Develop stronger interventions with a larger anticipated program impact.** With a greater effect size, fewer participants are required for the evaluation. With very strong programs, smaller sample sizes may permit data collection on control or comparison groups.
- **Use measures with small standard deviations.** The denominator of the statistic used to assess a program's impact is generally influenced by two factors: sample size and measurement error. When programs cannot afford to recruit or collect data on a large number of participants, careful selection of measurement tools can protect their ability to identify program-related change. For example, as a general rule of thumb, continuous measures of an outcome tend to have smaller standard deviations than dichotomous (yes/no) measures.

▲ Determine the anticipated size of the program impact on the target audience

Prior to the intervention, CNNS did not determine how much of an effect the Eagle Adventure program would have on program participants. Accordingly, it is difficult to determine whether their program failed to observe changes in dietary behavior as a function of implementation failures or because of statistical and measurement issues. When resources are limited, investigators can examine the published literature and assess the magnitude of programs similar to the intervention under consideration. Systematic reviews, such as the meta-analysis published by Knai and colleagues (2006), can be very useful. This paper provides a range of values for studies similar to the Eagle Adventure program. Investigators may take these values, use their best judgment regarding the degree of similarity between the published findings and the intervention under consideration, and make best case/worst case estimations to help in other facets of program planning.

▲ Match analytic strategies to the characteristics of the evaluation design

The CNNS evaluation team employed a simple Analysis of Variance (ANOVA) approach to estimate program impacts. This approach did not account for the complexities of the evaluation design (e.g., clustering of children within schools). Accordingly, results of their analyses must be viewed with caution because the level of variation in measured outcomes is likely to be underestimated. 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. Blitstein and colleagues (2005) describe methods for post-hoc correction.

A few well-selected variables can be added to most data collection efforts without additional cost or participant burden and can provide a great benefit to program evaluation. Variables that are related to the outcome, independent of the program and assignment to treatment condition, and not on the causal pathway can be used to account for systematic variation and to improve the precision of the impact evaluation. The CNNS team did not include information from covariates in its analysis. In a clustered design, covariates can be included that account for systematic variation at the cluster (e.g., school) or the individual level. Covariates at the individual level can be included when available without adverse effect; covariates at the cluster level must be added with care, because these covariates will reduce the statistical power for the test of the intervention.

Chapter V • Conclusions and Discussion

The Chickasaw Nation Nutrition Services (CNNS) implemented the Eagle Adventure program in five public elementary schools in Pontotoc County, OK, where Native American populations exceed the State average of 19 percent. The program, which includes a play and a series of four lessons based on the Eagle Book series, had the potential to reach approximately 700 children, as well as 800–1,000 of their parents and caregivers through take-home materials. This was the first time this SNAP-Ed intervention had been implemented; implementation ran from March to May 2010. The independent evaluation was designed to examine the implementation and impact of the Eagle Adventure program. This final chapter presents a summary and discussion of the key findings.

A. Key Process Evaluation Findings: Factors Supporting Implementation

Program staff and direct educators as well as principals and administrators from the five intervention schools reported that the Eagle Adventure program was relatively easy and straightforward to implement. Several key informants identified factors that contributed to the success of the implementation, including:

- **Relevance of messages and materials.** The designers and planners of the Eagle Adventure Program reported they strongly believed that the formative research they used to guide the development of their program was critically important in engaging two key stakeholder groups: principals and program participants. Based on feedback from principals, the relevance of the program messages, namely their focus on nutrition, physical activity, and more specifically diabetes prevention and education, influenced their decision to participate in the intervention. These findings are further supported by parent and caregiver feedback during focus groups and their perceptions of the program as it relates to the relevancy of the information provided and their engagement in the program.
- **Multiple modes and quality of message delivery.** The Eagle Adventure team believed that the play, which was designed to be entertaining and culturally appropriate, was an important way to start the program. Despite low attendance of invited parents and caregivers at the event, principals reported that the play was a hit with students. When asked what they thought were the most useful aspects of the program for the age groups of children being targeted, principals specifically cited the repetition of nutrition education messages in various formats. Principals also remarked on the high quality of materials (i.e. professionally designed, colorful) and well-trained staff used to implement the program; they indicated that these program attributes contributed to their buy-in to the program.

B. Key Process Evaluation Findings: Challenges to Implementation

There was some variation in how the program was implemented in each school, especially in terms of the total average exposure to the direct education lessons and play, which ranged from 128 to 160 minutes across the five schools, as well as the presence and participation of classroom teachers during each lesson. These variations may have had some effect on outcomes. Key informants identified some challenges to the implementation of the Eagle Adventure program, including:

- **Engagement of parents and caregivers in the intervention.** The Eagle Adventure team noted that effectively reaching parents was both critical to the program’s success and difficult to achieve. This is perhaps evidenced by the low rates of parent and caregiver attendance at the Eagle Adventure play and moderate use of materials.
- **Implementation time frame.** The timing of the intervention, specifically its overlap with the timing of standardized testing, was less than ideal according to the program team and principals and led to some schedule conflicts. The Eagle Adventure team and parents acknowledged that the relatively short timeframe for program implementation, namely the limited time between lessons, may have reduced parents’ and caregivers’ ability to make full use of the take-home materials and activities.
- **External factors that inhibit potential for behavior change.** Parents and caregivers noted two barriers to improving their children’s nutrition-related behaviors: cost and time constraints related to shopping for and preparing healthy food items and the mixed nutrition-related messages children receive in the school environment. These were noted as general barriers and were not specifically related to the Eagle Adventure program. However, the issue of limited resources and time parents and caregivers had to prepare the recipes provided through the Eagle Adventure program was also described as a challenge by focus group participants.

C. Key Impact Evaluation Findings

The goal of the Eagle Adventure program evaluation was to assess the impact of the intervention on children’s at-home consumption of fruits and vegetables. Based on results of the impact analysis, one cannot conclude that the Eagle Adventure program had the anticipated impact on children’s daily at-home consumption of fruits and vegetables based on parental reports. While there was an increase in the number of days that children who participated in Eagle Adventure asked for or helped themselves to vegetables as snacks, there was no evidence of change in the overall consumption of vegetables. Thus, there was no evidence to support the claim that changes in consumption of fruits or vegetables were related to the program.

The lack of statistically significant findings may be due to ceiling effects that limited the ability to detect significant change. As reported by parents and caregivers, children’s fruit and vegetable consumption in the home at baseline was quite close to USDA’s Food Guidance System recommendations (USDA, 2011). This may suggest that there was less room to improve children’s diets than initially anticipated or that parents and caregivers expressed an upward bias (e.g., social desirability) in reporting their children’s diet. Either of these would have limited the ability to observe change. Although the needs assessment conducted by CNNS did not provide data on children’s fruit and vegetable consumption, it provided evidence that diets of Native American youth in Oklahoma are less than adequate and are high in fat (CNNS, 2008).

Results of the evaluation suggest that children who participated in the Eagle Adventure program significantly increased their rate of self-initiated vegetable snacking. Although this increase was not strong enough to produce anticipated behavior changes in vegetable consumption, it is important to keep in mind that snacking constitutes only a small fraction of a child’s daily intake of fruit and vegetable. An examination of the 2003–2004 National Health and Nutrition Examination Survey data finds that among children aged 8 and 9 years (n = 308), 79 percent of fruit and vegetables (69 percent of fruit and 88 percent of vegetables) were consumed at meals rather than as snacks (CDC, 2004).

Additionally, the results show an important trend in children’s intentions to try new vegetables. As measured by parent and caregiver reports of their children’s willingness to try a new vegetable, the proportion of children in the Eagle Adventure group willing to try new vegetables increased from 34 percent at baseline to 44 percent after the intervention, and this increase was larger than what was observed in the comparison group (from 39 to 42 percent). Although this change did not reach statistical significance, it does demonstrate an important trend with changes occurring in the predicted direction.

On the other hand, there did not appear to be a statistically significant effect of participating in the Eagle Adventure program on willingness to try new fruits. In part, this was because parents and caregivers in both the comparison group and in the intervention group reported an increase in willingness over time. Also, the percentage of children willing to try new fruits at baseline was relatively high compared with willingness to try new vegetables, so ceiling effects may have made it more difficult for the program to influence further changes in this area.

Additionally, parents and caregivers increased the availability of fruits and vegetables at home, thereby increasing children’s access to fruits and vegetables such as bananas, apples, carrots, and celery. These behaviors, if sustained, may lead to increased in-home consumption of fruits and vegetables. However, the program did not appear to influence reinforcing factors, such as parents and caregivers offering children vegetables as snacks. The absence of greater changes in reinforcement by parents and caregivers may be one reason there were no changes in overall consumption of fruits and vegetables. Hence, this may be an area in which the program may want to increase future efforts.

D. Key Findings from the Assessment of CNNS’ Self-Evaluation

The quality of CNNS’ self-evaluation was assessed, and the methods and results of CNNS’ self-evaluation were compared with those of the independent evaluation.

- **The assessment identified strengths and weaknesses of the CNNS self-evaluation.** The CNNS evaluation employed a one-group pre–post test design with surveys of students participating in the intervention to evaluate the Eagle Adventure program. Strengths of the evaluation included the data collection methodology, limited participant attrition, and few missing data for the impact analysis. Weaknesses included a poor comparison strategy, an inadequate sampling approach, and data analyses did not account for the clustering of students within schools.
- **The CNNS self-evaluation found that children who received the Eagle Adventure program improved in a scale of healthy food choices.** These findings are encouraging, although the absence of a comparison group makes it difficult to interpret the cause of these changes. Comparing the results of the CNNS self-evaluation and the independent evaluation, both evaluations support the conclusion that the Eagle Adventure program led to some improvements with regard to children’s intentions to select more healthy foods.

E. Recommendations

Based on the findings from the independent evaluation, the Eagle Adventure intervention did not result in a measurable increase in daily at-home consumption of fruits and vegetables. This may be due to limitations of the evaluation or program implementation. Baseline consumption was quite close to USDA’s Food Guidance System recommendations (USDA, 2011), suggesting that there was less room to improve children’s diets than initially anticipated or that parents expressed an upward bias (e.g., social

desirability) in reporting their children’s diet. Either of these would have limited the ability to observe change.

Despite the lack of change observed for primary outcomes, there was a significant increase in the number of days per week that children exposed to the Eagle Adventure program asked for or helped themselves to a vegetable as a snack. There were also observed trends suggesting that children exposed to the Eagle Adventure program were more willing than other children to try new vegetables and that parents of exposed children reported greater availability of fruits and vegetables in the home. Additionally, program staff, direct educators, and school administrators reported that Eagle Adventure program implementation went very well and was relatively easy and straightforward. Parents and caregivers of children receiving the intervention reported relatively high use of program take-home materials and expressed satisfaction with the program overall.

For these reasons, with some improvements, the Eagle Adventure program is a potentially promising example of SNAP nutrition education, particularly for communities with a strong Native American influence. There were, however, key areas for program improvement that were identified through this evaluation, which could make the program more effective at impacting behavior change. These areas as well as recommendations for improving CNNS’ self-evaluation are noted below. It is also important to note that this intervention was designed to be culturally appropriate and specifically tailored for a Native American audience. The intervention schools that participated in this demonstration project had higher than average proportions of Native American children enrolled and are located in an area with a strong Native American influence, which could explain, in part, the high degree of satisfaction with program materials and messages. It was outside the scope of this evaluation to examine whether or not this program would be as well received in communities with a less notable Native American presence.

▲ Key Areas for Program Improvement

Overall, input from program staff, parents, and caregivers suggests that revisions are needed to make this intervention more accessible to low-resource families and to the diverse population of children, parents, and caregivers whom it seeks to serve. However, both groups of key informants had many ideas and suggestions for ways in which the program could be improved. For example, to enhance program visibility program staff suggested a concurrent social marketing campaign, while parents and caregivers suggested increased communication from the school about the program, as well as recipes shared via the Web. In addition to these suggestions, it is also recommended that the program more adequately address parent and caregiver concerns about the cost and time constraints related to shopping for and preparing healthy foods on a limited budget (e.g. the addition of a parent tip sheet on this topic, in-store demonstrations, and emphasizing that all forms of fruits and vegetables—including fresh, frozen, canned and dried—are encouraged), and to the extent possible, issues related to children’s receipt of mixed messages in the school environment (e.g. increase teacher engagement in the program or include teachers as a target audience of the intervention to promote their reinforcement of nutrition education messages).

▲ Suggestions for Improving Evaluations

For future evaluations, it is suggested that CNNS use an evaluation design that can reduce plausible alternative explanations of program impact, such as including a comparison group; determine the anticipated size of the program impact on the target audience before the intervention; and match the analytic strategies to the characteristics of the evaluation design. These changes would improve the quality of the evaluation and increase CNNS’ ability to accurately measure changes attributable to the program.