

## Executive Summary

The Special Supplemental Nutrition Program for Women, Infants, and Children (WIC) was established to counteract the negative effects of poor nutrition on the prenatal and pediatric health of low-income individuals. WIC provides direct nutritional supplementation, nutrition education and counseling, and increased access to health care and social services to pregnant, breastfeeding, and postpartum women; infants; and children up to the age of five years. The program is administered by the Food and Nutrition Service (FNS) of the US Department of Agriculture (USDA).

To receive WIC benefits, an applicant must be categorically eligible (a pregnant woman or a two-year-old child, for example); must reside in the State in which the application is filed; must be income eligible (usually defined as equal to or less than 185 percent of the federal poverty income guidelines); and at nutritional risk as determined by a competent professional health authority.

Federal regulations specify content and amount of food items in WIC food packages that are designed for different categories of participants. These prescriptions contain foods that are good sources of the nutrients most likely to be lacking in the WIC population's diet - protein, iron, calcium, and vitamins A and C. The food packages are grounded in the developmental needs of infants as well as in pediatric recommendations about infant feeding. Food package designers also incorporated the recommended eating patterns for preschool children and the additional nutritional requirements of pregnant and breastfeeding women.

Nutrition education is an integral part of WIC and its provision is considered a key WIC benefit. Federal regulations require WIC service providers to offer participants at least two nutrition education sessions during each certification period. Certification tends to occur every six months. State WIC agencies and their local WIC service providers design educational programs that are appropriate for their participant caseloads. Whatever the delivery mechanism, this education must stress the relationship between proper nutrition and good health.

In 1994, FNS initiated the *WIC Nutrition Education Demonstration Study*. The demonstration had two components: a comparison of the effects of innovative and traditional WIC nutrition education for prenatal participants; and a study of the feasibility and effectiveness of providing nutrition education to preschool (three-and-four-year-old) WIC participants. The report

summarized here describes the design and implementation of the child nutrition education demonstration and presents findings describing the effectiveness of the demonstration.

## **Designing the WIC Preschool Nutrition Education Demonstration**

The developmental phase of the demonstration involved the preparation of two products for use with three- and four-year-old WIC children: a nutrition education lesson and a child test.

### ***The Preschool Lesson***

A key element of the design of this demonstration was the formulation of clear and specific learning objectives. The three learning objectives for the demonstration incorporated concepts from the Food Guide Pyramid, a colorful graphic developed by USDA and the US Department of Health and Human Services to illustrate the recommendations of *Dietary Guidelines for Americans*. Two primary factors were taken into account when objectives were defined: the developmental appropriateness of the goals for preschool WIC children; and the feasibility of successfully covering the objectives in a thirty-minute, one-time class. In addition, it was important to create a lesson that could be taught by WIC staff who are unlikely to be trained in preschool education. The demonstration objectives are listed below.

#### **Objective 1    Food Pyramid**

Children will be able to identify the Food Pyramid.

Children will be able to distinguish the different food groups on the Food Guide Pyramid.

Children will be able to identify and name foods in the food groups on the Food Guide Pyramid.

Children will understand that they should eat more food from the bottom segment of the Food Pyramid and less food from the top.

#### **Objective 2    Variety**

Children will understand that they need to eat a variety of foods to stay healthy and grow.

#### **Objective 3    Food Choices**

Children will be able to correctly identify "anytime" foods and "sometimes" foods.

Children will understand that "anytime" foods should be eaten more often than "sometimes" foods.

Children will understand that "anytime" foods promote growth and health better than "sometimes" foods.

Working with these objectives, FNS chose to adapt lessons from the *Kid's Club* curriculum, developed by child educator Barbara Mayfield. Material was drawn from three *Kid's Club* components: variety, the food pyramid, and healthy versus junk foods. The demonstration lesson involved activities which address a child's cognitive, affective, and behavioral domains. It also incorporated different learning strategies such as self-learning, meaningful learning, and concrete learning. Lesson content was drawn from the principles behind the Food Guide Pyramid. Children were told how eating well helps them to grow and stay healthy-topics in which they are interested. Finally, materials were colorful and appealing to capture a child's immediate interest.

### ***The Preschool Test***

Designing the test of nutrition knowledge required generating and validating a test composed of items that are directly related to the educational objectives of the demonstration and that are also appropriate for the developmental levels of children ranging from thirty-six to fifty-nine months of age. The nutrition education lesson was limited to thirty minutes; the time for the test was limited to ten-to-fifteen minutes to ensure that the single contact would last no longer than forty-five minutes. The time was limited to avoid fatigue in children and to limit additional time families spent at the WIC agency.

FNS and Abt developed a child test composed of nine items directly related to the educational objectives identified earlier in this chapter. Test items were constructed to maintain a child's interest in a one-to-one interview during a ten-to-fifteen-minute testing period. Pilot-testing occurred in two stages: the item development stage and the final pilot test stage. The purpose of the first stage was to establish that children in the target age group could respond appropriately to test items and that their ability to respond would be enhanced following a brief educational intervention. During this phase, in which forty-seven children were tested, the nutrition education lesson was modified, and some test items were added while others were revised or discarded.

The final pilot-testing phase focused on establishing reliability and validity of the overall test as well as for the items comprising the test. This phase involved fifty-three children: thirty were

pretested and twenty-three were post-tested. Results of the pilot-testing demonstrate that three- and four-year-old children in the post-tested group - that is, the children who were tested after attending the nutrition education lesson - scored higher on most test items than children in the pretest group. Item-specific results indicate that the individual test items are valid measures for preschoolers.

### **Implementing the Preschool Demonstration**

The demonstration took place in two local WIC agencies Site A and Site B. With grants from USDA, each demonstration site employed an individual to teach the preschool classes. Demonstration lessons were offered several times each week during the data collection period which began in February 1996 and ended in November 1996. Child WIC participants were scheduled for either morning or afternoon sessions and were tested on the days they attended classes. Children were randomly assigned to either pretest or post-test. Preschool classes were scheduled to coincide with WIC certification appointments. Parents completed most certification activities during the lessons. Children in the pretest group were tested prior to attending nutrition education; children in the post-test group were tested after the lessons.

The child testers observed fifty-one nutrition education lessons across the two demonstration sites. Using a standardized observation protocol, specific information about the process and content of the classes was recorded. Information was collected about session length, attendance, amount of time devoted to each nutrition topic, disruptions, environmental considerations, and the quality of interactions between nutrition educators and children.

Very few differences were observed across sites. Attendance, usually two children per lesson, was the same at both sites. The entire lesson was, on average, six minutes longer at Site B because, at that agency, the nutrition educator chose to incorporate the snack into the lesson. At the other agency (Site A), children received snacks after they were told the lesson had ended. Site B - with longer class times - also experienced more disruptions during lessons because that agency did not have an available and separate room to assign to the demonstration. We do not know the effects of these differences on child testing. The lower test scores of Site B may have been affected by these disruptions. Nonetheless, we found higher post-test scores for children at Site B.

### **Impact of the WIC Preschool Demonstration**

As noted earlier, a concern-during-the evaluation's development phase was minimizing burden on three- and-four-year-Old WIC participants and their parents. The goal was to design a research approach which would allow WIC preschoolers to participate as much as their developmental stages permitted. The final research design was a quasi-experimental design—separate-sample pretest-post-test design. Much of the strength of this design was in its randomization which provided us with equivalent groups of children for pre- and post-testing. Immediate post-testing of children was another design benefit because observed effects can more reliably be attributed to the educational intervention which has just occurred. Moreover, this design provided data for overall and subgroup analyses and also reduced burden on children and their parents or caretakers.

Across the two demonstration sites, the final sample was comprised of 497 children who were tested at two test points. Exhibit E.1 contains information on overall sample size by site and by test point. There were about 10 percent more total tests at Site A than at Site B.

### **Exhibit-E.1**

#### **Sample Size by Test Point by Site**

	<b>Site A</b>	<b>Site B</b>	<b>Total</b>
<b>Pretest</b>	<b>133</b>	<b>145</b>	<b>278</b>
<b>Post-test</b>	<b>126</b>	<b>93</b>	<b>219</b>
<b>Total</b>	<b>259</b>	<b>238</b>	<b>497</b>

The random assignment resulted in equivalent groups of WIC children by test point. There were no-significant differences in age or gender across the groups of children. The average age for all pretested children was 46 months; for post-tested children, the average age was 47 months.

Child tests were scored using standardized protocols, and item scores were scaled to permit calculation of a total score for each child test. Using scaled scores, we calculated average (mean) scores by test point, site, age, gender, and race-ethnicity and then compared pretest with post-test scores. Findings are presented only by site.

At both sites, there were significant differences between test scores for the pretest and post-test groups (Exhibit E.2). Overall, WIC preschoolers had significantly higher post-test scores than pretest scores. At post-test, children at Site A correctly answered 48 percent of the items as compared with 34 percent at pretest; at Site B, children answered 45 percent correctly as compared with 34 percent. Children, at Site A, who attended the nutrition education lesson scored 14 percentage points higher on the test of nutrition knowledge than did children tested before the lesson. At Site B, the difference was 11 percentage points. Analyses by site, age, and gender suggested that results (mean test scores and pretest-post-test differences) were consistent across these categories. Four-year-old children had significantly higher test scores at both test points because four-year-olds are developmentally more advanced than three-year-olds. (Note that our analyses controlled for the effects of age on test scores.) The correlation between age and total score was high, accounting for 14 percent of the variation in total score. Analyses of variance and covariance indicated that test point (pretest versus post-test) and age were the important predictor variables of child performance.

Item-specific analyses supported the overall findings. Five of the nine test items showed statistically significant differences at the  $p < .001$  level for pretest-post-test differences; seven were significant at the  $p < .05$  level. For both three- and four-year-olds, four items showed statistically significant differences. Three additional items were significant only for four-year-olds. Again, item-by-item variance analysis indicated that for seven of the nine items, age was the important predictor of whether or not a child will correctly answer the question.

**Exhibit E.2****Mean Total Test Scores for WIC Children by Test Type and by Site**

	<b>Mean Score for All Children</b>		<b>Mean Score by Age</b>			
	<b>Mean</b>	<b>Standard Deviation</b>	<b>Mean</b>	<b>Three Years Standard Deviation</b>	<b>Mean</b>	<b>Four Years Standard Deviation</b>
<i><b>Pretest</b></i>						
Site A	3.73 n=133	1.38	3.40 n=78	1.13	4.21 n=55	1.57
Site B	3.75 n=145	1.26	3.55 n=87	1.11	4.06 n=58	1.42
<i><b>Post-test</b></i>						
Site A	5.31*** n=126	2.16	4.19* n=62	1.72	6.39*** n=64	1.99
Site B	4.96*** n=93	1.62	4.19* n=46	1.45	5.72*** n=47	1.43

\* Difference between pre- and post-test significant at the  $p < .05$  level.

\*\*\* Difference between pre- and post-test significant at the  $p < .001$  level.

**NOTES:**

Mean is for total score.

Highest possible total score is 11.0.

Exhibits F.2 and F.3 in Appendix F contain more detailed calculations of these test results.

## **Conclusions**

The objective of this evaluation of the *WIC Nutrition Education Demonstration Study* was assessing the viability and effectiveness of a nutrition education intervention for preschool WIC participants. The findings summarized above indicate that preschool nutrition education may be a viable strategy for the WIC Program. Overall results are summarized below.

- Nutrition education is feasible for three- and four-year-old children in WIC settings.
- The demonstration's nutrition education lesson improved children's knowledge (as evidenced in statistically significant differences between pretest and post-test scores) about certain nutrition topics such as the Food Guide Pyramid, food groups, and eating food that makes them healthy and strong.
- Some nutrition education concepts may be too difficult for three- and four-year-old children to learn. These topics include: eating a variety of foods, selecting companion foods, and identifying "anytime" foods.
- Short interventions appear to be practical strategies for teaching WIC preschoolers about nutrition.
- More information is needed on the cost and sustainability of preschool nutrition education in the WIC Program.