

## **Team Nutrition Initiative and Nutrition Education and Training Program**

This chapter describes two programs: the Team Nutrition (TN) Initiative and the Nutrition Education and Training (NET) Program. Both programs, which are implemented primarily in schools, differ from other food assistance and nutrition programs (FANPs) in three important ways. First, the primary focus of each program is educational in nature—to promote healthful eating patterns. Neither program provides food or enhances food purchasing power. Second, neither program considers income in targeting benefits. That is, both programs are intended to serve all children, unlike other programs that offer greater benefits to low-income children, as the National School Lunch Program (NSLP) and School Breakfast Program (SBP) do, or that are limited to children with specific nutritional risks, as the Special Supplemental Program for Women, Infants, and Children (WIC) does.<sup>164</sup> Finally, target audiences for both TN and NET services extend beyond children to include teachers, school foodservice workers, parents, and community members, all of whom may influence children's food choices.

After the Senior Farmers' Market Nutrition Program, which began in FY 2002, TN is the youngest FANP. It was created in 1995 as part of the comprehensive School Meals Initiative (discussed below). The NET program has been authorized for more than 25 years but has not received funding since FY 1998.

The following sections describe the TN Initiative and the NET program, in turn, and then summarize relevant research for each program. The TN Initiative is described first because it is the program that is currently active. Relatively little research has been done on either program.

### **Overview of the Team Nutrition Initiative**

The Team Nutrition (TN) Initiative is a cornerstone of USDA's School Meals Initiative for Healthy Children (SMI). SMI was launched in 1995, with the explicit goal of improving school meals by providing schools

with educational and technical resources that could be used to (1) encourage children to eat healthy meals and (2) assist foodservice staff in preparing nutritious and appealing meals.

The impetus for SMI can be traced to findings from the first *School Nutrition Dietary Assessment Study* (SNDA-I). This national study of the NSLP and SBP found that NSLP meals were higher in fat, saturated fat, and sodium and lower in carbohydrates than recommended by the *Dietary Guidelines for Americans* (DGA) and the National Research Council (Burghardt et al., 1993; U.S. Departments of Agriculture and Health and Human Services, 1990; National Research Council, 1989). At the time the SNDA-I data were collected, program regulations did not require that NSLP meals be consistent with these recommendations, and meals generally satisfied the nutrition standards that were in effect—providing one-third of students' daily requirements for food energy and key nutrients.

Since the SNDA-I study revealed that school meals were not consistent with accepted guidelines for healthful eating, USDA has been working on many fronts to enhance the nutritional quality of school meals. In 1995, USDA formalized its commitment to implementing the *Dietary Guidelines* in school meals by launching SMI. Key components of SMI include changes in the nutrition standards defined for school meals and an expansive change in the procedures used to plan and evaluate school menus (SMI nutrition standards and menu planning options are discussed in detail in chapter 5). The new nutrition standards maintain the traditional goal of satisfying some portion of students' needs for energy and key nutrients (one-third for the NSLP and one-fourth for the SBP), but also specify goals for fat and saturated fat content that are consistent with *Dietary Guidelines* recommendations.

To ensure that these changes in program policy and operations would be implemented successfully and accepted by program participants, USDA also included in SMI a comprehensive plan for providing technical assistance, educational resources, and training for school foodservice personnel as well as other stakeholders in the school meals programs—children, parents, teachers, and administrators. This plan is the TN Initiative.

<sup>164</sup>The Team Nutrition Initiative also provides nutrition education materials to other FANP programs, such as the WIC Program and the FSP.

TN provides support to schools via three different behavior-oriented strategies:

- Training and technical assistance for school foodservice professionals to assist them in preparing and serving meals that meet the new nutrition standards without sacrificing taste or attractiveness.
- Nutrition education for children and parents to build the motivation for adopting healthful eating habits and regular physical activity and the skills required to do so successfully.
- Involvement of school administrators and other school and community partners in building support for recommended healthful eating and physical activity patterns (USDA/FNS, 2002a).

Schools formally enroll as “Team Nutrition Schools” and make a commitment to do the following:

- Support USDA’s Team Nutrition goal and values.
- Demonstrate a commitment to help students meet the *Dietary Guidelines for Americans*.
- Designate a Team Nutrition School Leader who will establish a school team.
- Distribute Team Nutrition materials to teachers, students, and parents.
- Involve teachers, students, parents, foodservice personnel, and the community in interactive and entertaining nutrition education activities.
- Share successful strategies and programs with other schools (USDA/FNS, 2004).

However, FNS has no way of tracking the extent to which enrolled TN schools actually engage in the above activities.

TN was explicitly designed on a theoretical framework—social learning theory—that explains how people make behavior choices. As such, the focus of the program is to promote behavior change, not simply to impart information (with the hope that this might lead to behavior change). TN employs six “reinforcing communication channels to reach children where they live, learn, and play, as well as the adults who care for them and can influence their behavior” (USDA/FNS, 2002b). The communication channels are foodservice initiatives, classroom activities, schoolwide events,

home activities, community programs and events, and media events and coverage. TN has established, and continues to build, relationships with national organizations that agree to work on large, visible TN projects. Examples include the American Culinary Federation Chef and Child Foundation, which sponsors cooking and taste-testing activities in local schools, conducted by professional chefs.

In FY 2002, TN was funded at \$10 million (French, 2002). This level of funding has been relatively constant since FY 1996. Schools in all 50 States, the District of Columbia, and the U.S. territories have enrolled as TN schools. All State child nutrition agencies actively participate in the program and are eligible to apply for competitive grants to fund TN activities.

## Research Review of the Team Nutrition Initiative

When TN was launched in 1995, plans were included for a pilot project that would test the effectiveness of the program in influencing children’s food choices and provide information on implementation issues that could be used to guide future policies and technical assistance. The evaluation of this pilot project is the only formal evaluation of TN conducted to date.

### Team Nutrition Pilot Implementation Project

Seven school districts were competitively selected to serve as pilot sites for the TN Pilot Implementation Project (USDA/FNS, 1998). Schools were selected based on a demonstrated capacity to meet the requirements inherent in both TN implementation and the associated evaluation. Four of the seven districts were selected to participate in an in-depth outcome evaluation; the other three districts participated in a limited process study.

The TN pilot was designed to test optimal implementation of the initiative. Participating districts were required to have designated TN coordinators. In addition, staff in each district received orientation, training, and materials that, in regular practice, a TN school would not receive. Although these practices may have given the pilot sites some advantages over a typical school, sites also dealt with many issues that put them in a less favorable situation than schools might typically encounter. These issues included a number of constraints associated with the evaluation, such as condensed implementation schedules and limited read-in

time, recordkeeping and other burdens associated with data collection, and restrictions on use of local media outlets to avoid contamination of comparison schools. In addition, pilot schools were not immune to routine challenges faced by all schools, including competing for limited classroom time and resistance to change on the part of school foodservice staff. On balance, results from the evaluation probably provide a fairly realistic picture of what TN can accomplish.

### **Research Design**

Participating school districts (communities) nominated at least two matched pairs of elementary schools. Schools were matched on size (total enrollment), proportion of students eligible for free and reduced-price meals, racial/ethnic composition, extent of existing nutrition education activities, and characteristics of the foodservice program. Across all four pilot sites, 12 pairs of schools were nominated. One of the schools in each pair was randomly assigned to the TN group and the other to a comparison group, resulting in 12 treatment schools and 12 comparison schools.<sup>165</sup> The comparison schools agreed not to implement any TN activities and to delay any non-TN nutrition education activities.

Districts selected three elementary grades in which to implement grade-specific nutrition education curricula (different versions for Pre-K and K, grades 1 and 2, and grades 3 and 5) in the TN school. The impact evaluation focused solely on *fourth graders* because of limited resources and the belief that children in this age range could reliably complete study surveys, including food frequency items. A total of 144 fourth-grade classrooms participated in the evaluation.

In addition to implementing the classroom curricula, pilot districts agreed to train teachers and foodservice personnel to implement menu changes that would promote compliance with the DGAs, and to conduct a number of different core TN activities, including, at a minimum:

- Two cafeteria-wide events.
- Three parent-contact activities.
- Two chef activities.
- One district-wide community event.
- One district-wide media event.

<sup>165</sup>Because some aspects of the TN intervention specifically involve the entire school or surrounding community, randomly assigning either classrooms or students to treatment and control groups was not feasible.

Because some activities could be structured to meet more than one requirement, school districts were required to conduct at least five different activities.

The TN pilot was implemented and evaluated in two phases: spring 1996 (Phase I) and fall 1996 (Phase II). The same classrooms participated in each phase. Each phase included a pre-post design in both treatment and comparison schools. Followup data were collected the following school year for Phase I students (who were then in fifth grade) to assess long-term retention of any favorable impacts.

The evaluation assessed the impact of TN in three key areas: skill-based nutrition knowledge, nutrition-related motivation and attitude, and food consumption behaviors. Survey items and observational measures were chosen to assess changes associated with specific TN messages to eat more fruits, vegetables, and grains; to eat less fat; to eat a balanced diet; and to increase the variety of foods eaten. Knowledge, attitudes, and self-reported behaviors were measured using self-administered questionnaires. A total of 1,509 students in Phase I and 1,441 students in Phase II completed both pre- and post-tests (response rates ranged from 86 to 91 percent). Data on students' food choices and consumption behaviors were obtained through cafeteria observations carried out by trained field staff. More than 3,000 meals were assessed at each measurement point, representing response rates of 79-85 percent. The evaluation also included measure of food consumption behaviors that relied on student self-reports and parents' perceptions.

### **Research Findings**

Because the research design included multiple data points for each subject, a repeated measures approach was used in the analysis. The direction and amount of change was assessed for treatment and comparison groups, and the net difference was attributed to the impact of TN. Regression analysis was employed, using a mixed models approach to control for clustering of the study sample. Data were generally aggregated across districts. Data from meal observations were analyzed within district and by phase, however, because of lack of comparability in menus.

Results showed that TN had small, but consistently positive and statistically significant, impacts on two of three measures of skill-based knowledge and on three different measures of nutrition-related attitudes and motivation. For skill-based knowledge, significant and positive impacts were noted for students' ability to (1) identify healthier choices and (2) apply knowledge of

the Food Guide Pyramid. Students' ability to apply a "balanced diet" concept also increased, relative to pretest scores, but differences were not statistically significant. Nutrition attitude and motivation measures included a general attitude score as well as separate scores for perceived consequences of increased consumption of fruits, vegetables, and grains, and a "cognitive rules" scale, which asked students about their willingness to make healthier food choices and their understanding about what that required. The relative size of the impacts was small (generally an increase of less than one correct answer). This did not seem to be attributable to a ceiling effect. The authors suggest that the impacts reflect the short implementation period used for the evaluation and speculate that greater effects could be achieved with a more protracted period of intervention.

Followup data showed that significant TN effects were maintained over time, although the size of the impact decreased for three of the five measures that were significant during Phase I. Estimated impacts were equivalent or greater at followup, compared with Phase I, only for the general attitudes measure and for perceived consequences of increased consumption of fruits, vegetables, and grains.

Effects on observed food selection and consumption behaviors in the cafeteria were modest. The only significant effects that were noted consistently in all districts were a slight increase in the amount of grain foods eaten and a small increase in the diversity of foods eaten (the number of different food groups included and total number of items). Changes in the selection and consumption of fruits, vegetables, and low-fat milk were in the expected direction, overall, but were not statistically significant or consistent across districts.

Analysis of three different measures of self-reported eating behaviors showed that TN had small but statistically significant effects on students' self-reported behaviors. The specific behaviors examined were use of low-fat foods, consumption of fruits and vegetables, and dietary variety (the number of food groups included in meals and snacks eaten the previous day). Three different multivariate models were used to assess TN's impact on self-reported eating behaviors: a uniform treatment model (treatment defined as a binary variable), a discrete component model (treats TN treatment as several discrete components and estimates effects for each), and a level of exposure model (treats TN treatment as a continuous variable, ranging from zero to six, based on the number of channels to which the student was exposed). Results for all three models

were largely congruent and demonstrated that TN had a small but positive and statistically significant impact on students' self-reported eating behaviors (all three measures). However, none of these impacts persisted over time.

The discrete components model was not successful in identifying the most influential component(s) of the program because of change in or omission of various program components over the course of the demonstration. The level of exposure model reinforced results of previous research, indicating that the impact of TN varied depending on the number of channels to which a student was exposed.

## Overview of the Nutrition Education and Training Program

The beginnings of the NET program can be traced to the 1969 White House Conference on Food, Nutrition, and Health (Maretzki, 1979). The White House conference emphasized the importance of good nutrition during childhood and the need for children, parents, and school foodservice personnel to understand the relationship between good nutrition and health. The conference stimulated interest in school-based nutrition education and the possibility of collaboration between school foodservice staff and educational staff.

The NET program was established in 1977, 8 years after the White House Conference, under P.L. 95 166, the National School Lunch Act and Child Nutrition Amendments. NET was envisioned as a means of using the school meals programs and school cafeterias as learning laboratories for helping children develop a better understanding of the principles of healthy eating. The intent of the program was to teach children the value of a nutritionally sound diet, develop nutrition education curricula and materials, and train teachers and school foodservice personnel (Maretzki, 1979).

Major goals of the program, as stated in the enabling legislation, include the following:

- The instruction of students, preschool through grade 12, in the nutritional value of foods and the relationships between food and health.
- The training of school foodservice personnel in nutrition, foodservice management, and the use of the school cafeteria as an environment for learning about food and nutrition.

- The in-service education of teachers and other school staff in nutrition education and in the use of the cafeteria as a learning laboratory.
- The identification, development, and dissemination of nutrition education resources and curricula.

The program is administered at the State level. FNS awards NET grants to States, and States appoint a State Coordinator to administer the funds. The Coordinator must assess the State's nutrition education and training needs, develop a State plan for meeting those needs, and implement the program according to the plan. NET resources may be used to develop curricula and materials, implement nutrition education programs for children, and conduct in-service training for foodservice and classroom personnel.

States have considerable autonomy in allocating NET program funds. States have used their NET funds in vastly different ways that reflect not only the results of their needs assessments, but also the status of their school-based nutrition education, training, and resources at the time NET began. Some States have spent significant resources in curriculum development, while others adopted or adapted existing materials and focused on dissemination. Still others encouraged local school districts to develop projects that suited their own needs.

States are required to submit annual reports that provide information on program dissemination, including the number of individuals who participated in NET program activities and the number of NET publications that were distributed. States must also describe their key accomplishments and outcomes. Reported outcomes are descriptive in nature, such as the number and type of workshops that were held, rather than measures of program impacts.

### Program Funding

NET has had a roller-coaster funding history. Funding for FY 1978 and FY 1979 was authorized at \$0.50 per child enrolled in schools and institutions participating in the NSLP—roughly \$26.2 million per year. A minimum level of \$75,000 was established for individual State grants.

This initial level of funding was not maintained for long (USDA/FNS, 2002c). By FY 1981, only 3 years after the program started, funding had been reduced to \$15 million, a 42-percent decrease. In FY 1982, funding was further decreased to \$5 million, only about 19 percent of initial funding. This level of funding was maintained

through FY 1990 and was accompanied by a decrease in the number of students, educators, and school foodservice personnel served by the program (Kalina et al., 1989).

In 1989, growing public concern over children's nutritional well-being and specific concerns about the nutritional quality of school meals contributed to a resurgence of interest in NET, particularly as a means for providing training for foodservice personnel (Nelsen, 1992). P.L. 101-147 (November 10, 1989) reauthorized NET for 5 years (FY 1990-94). During this interval, NET authorization levels grew from \$10 million to \$25 million. In 1994, P.L. 103-448 authorized the NET program permanently, with annual funding of \$10 million for FY 1996 and each year thereafter. Funding was increased to \$7.5 million in FY 1991 and then to \$10 million in FY 1992. Annual funding continued to be approximately \$10 million through FY 1996.

In August 1996, P.L. 104-193 changed NET funding from mandatory to discretionary for FY 1999-2002. However, since 1996, NET has received funding only once, in FY 1998 (\$3.75 million).<sup>166</sup> The curtailment of NET funding that began in FY 1997 coincided with the beginning of TN, which has been funded at about \$10 million annually since FY 1996.

## Research Review of the Nutrition Education and Training Program

The NET program was developed at a time when most nutrition education programs were based, expressly or implicitly, on the KABINS model: the assumption that an increase in **K**nowledge will affect **A**ttitudes, which in turn will affect **B**ehavior and ultimately **N**utritional Status (Contento et al., 1992). Today, nutrition educators realize that promoting behavior change, particularly among children, is a more complicated process. These understandings have contributed to the theory-based underpinnings of the TN Initiative, which makes ample use of social learning theory and social marketing to more directly target behavior change.

Given the underlying assumptions of the NET program model, it is not surprising that most studies of NET focused exclusively on impact on nutrition knowledge. Research has shown that change in knowledge is easily achieved, even by short-term programs (Contento et

<sup>166</sup>In FY 1997, NET operated with \$3.75 million that was reprogrammed from TN funds.

al., 1992). In the context of this review, research that assessed knowledge gain or change in attitude, without some assessment of eating behavior, was considered insufficient. This research is well summarized elsewhere (Contento, 1992; Lytle, 1994). The following sections describe the limited available research on the effects of NET interventions that measured impacts on eating behaviors. Impacts on nutrition knowledge and/or nutrition-related attitudes assessed in this research are also described.

### National Nutrition Education and Training Program Evaluation

The only national study of NET was completed during the very early stages of the program, between 1979 and 1980 (St. Pierre and Rezmovic, 1982). At that point, it was plausible to expect program impacts in only a few States that had been able to begin implementation almost immediately after funds became available. Moreover, because of the diversity of States' goals, only State-specific impact evaluations were deemed appropriate.

Consequently, impact assessment in the National Nutrition Education and Training Program Evaluation focused on program activities and outcomes in two States: Georgia and Nebraska (St. Pierre and Rezmovic, 1982). (The study also collected descriptive data at the national level, including an analysis of State plans.) The programs in Georgia and Nebraska were firmly established and were widely respected by NET staff at the regional and national levels.

The evaluation of the Nebraska NET program focused on assessing how well the program was implemented, as well as its impact on children's nutrition-related knowledge, attitudes, preferences, and eating habits. Nebraska offered a statewide curriculum that was experience-oriented in the primary grades, but knowledge-oriented in grades 4 through 6. Twenty schools were selected from 98 volunteers and were randomly assigned to treatment and control groups. A pre- and post-test design was used, with the pretest conducted immediately after the 10-week treatment concluded.<sup>167</sup> No followup measures were collected.

At pretest, treatment and control groups were equivalent on all outcome measures (St. Pierre et al., 1981). At post-test, NET participants in all grades had statistically

superior gains in nutrition knowledge. In addition, NET participants in grades 1 through 3 were also found to be more willing than nonparticipants to try new foods in the school cafeteria and more likely to have made improvements in food preferences (based on self-report). NET participants in grades 4 through 6 were more willing than nonparticipants to try previously rejected foods. Results showed no consistent effects on nutrition-related attitudes, self-reported eating behaviors, or plate waste.

In Georgia, the State chose to follow a decentralized model, in which schools were free to use different nutrition education curricula and materials. The evaluation included 1,400 students in grades 1 through 8. Results showed that NET had strong positive effects on nutrition knowledge but limited effects on attitudes and self-reported eating behaviors (St. Pierre and Glotzer, 1981).

The authors appropriately point out several factors that limit the generalizability of their results. A major limitation is the quasi-experimental design, with the incumbent potential of nonequivalent NET and non-NET groups (on factors other than pretest measures). Another major limitation is the duration and content of the intervention. The authors questioned whether it was appropriate to expect changes in behavior from an intervention that was limited in time and essentially focused on knowledge dissemination (St. Pierre, 1982). Other factors that complicate interpretation of the study's findings are the exposure of some non-NET students to other (non-NET) nutrition education activities during the treatment period and the significant nutrition education that had been conducted in many classrooms before the NET intervention.

### Other Studies of NET's Impact

The literature search identified three small, local studies that examined the impact of NET interventions on children's nutrition-related knowledge, attitudes, and/or eating behaviors.<sup>168</sup> One of the earliest studies examined the NET program in Tennessee. Tennessee's first NET Plan included a detailed evaluation plan (Banta and Cunningham, 1982). Assessment instruments were developed for students, parents, teachers, school administrators, and foodservice personnel. All instruments included self-reported measures of nutrition behaviors. A plate waste study was devised to measure student-level changes in food consumption.

<sup>167</sup>Nebraska's *Experience Nutrition* curriculum had 11 segments, designed to be used sequentially for grades K through 6 with an expected cumulative impact on children's behavior. However, the evaluation was only able to test for an immediate effect of the particular segment used in each classroom (St. Pierre et al., 1981).

<sup>168</sup>The literature search revealed several published studies that evaluated the impact of NET on the knowledge and attitudes of teachers and/or foodservice personnel. These results are summarized elsewhere (Olson, 1994).

Baseline data were collected in 36 elementary schools—2 treatment schools and 2 control schools in each of 9 so-called development districts. No details are available in the published literature on the school selection process or on the characteristics or comparability of treatment and control groups (Banta and Cunningham, 1982; Banta et al., 1984).

The first post-test was conducted after less than 1 year of NET interventions. At this point, fourth and sixth graders in treatment schools were more likely than those in control schools to report positive eating behaviors. In addition, first graders in treatment schools were more likely than those in control schools to report having eaten the school lunch. However, plate waste studies found no significant differences in food consumption treatment and control students at any grade level. At the last followup (year 3 of the study), significant differences were noted between NET and non-NET students for knowledge gain (at all grade levels) and for attitude scores (at four grade levels). Again, however, no significant differences were detected in self-reported eating behaviors or in plate waste (Banta et al., 1984).

Also in the early 1980s, Gillespie (1984) studied three NET interventions in New York State. Three schools that had received mini-grants from the New York State NET program (and used them for very different activities) were matched with control schools based on size (total enrollment), community socioeconomic indicators, staff interest in nutrition education, and type of food service.

The study included pre- and post-test assessments of students' nutrition knowledge and attitudes. In addition, after the intervention was over, parents were asked whether they observed changes in the foods their children ate, their children's interest in eating nutritious foods, or their children's understanding of nutrition. Similarly, teachers were asked whether they noticed changes in children's food choices or their attitudes toward nutrition.

After controlling for differences in baseline scores, Gillespie found no significant improvement in nutrition knowledge or attitudes among NET students. Both groups of students showed significant gains in knowledge and attitude measures at post-test, and the difference in relative size of the gains made by each group was not significantly different.

With regard to parental reports of children's eating behaviors, Gillespie found that parents in NET schools that had the most intensive intervention were more

likely than their non-NET counterparts to report an improvement in the quality of foods chosen for snacks eaten away from home. Effects on reported quality of at-home snacks were inconsistent. No effects were detected for any of the other parent-reported measures or for the teacher-reported measures.

Shannon and Chen (1988) conducted a 3-year study of the NET program in Pennsylvania. The authors assessed the knowledge, attitudes, and self reported behaviors of children as they progressed through grades 3, 4, and 5. Districts that responded to an invitation to join the study were grouped by geographic region and ranked according to nutritional need and community socioeconomic status. The 12 neediest districts were offered participation in the study, but two declined.

Schools in the remaining 10 districts were then randomly assigned to treatment and control groups. Initial assignments were adjusted because of administrative contingencies. For example, one principal supervised three of the small schools and wanted all of them to be in the same group. The resulting baseline sample included 17 treatment schools with 879 students in 39 third-grade classrooms and 18 control schools with 828 students in 36 classrooms. Students in the treatment group received 9-12 weeks of nutrition education each year based on the *Nutrition in a Changing World* curriculum.

In the end, the treatment group had significantly greater knowledge gains than the control group, as well as significantly greater improvements in some attitude measures. However, no significant impacts were detected for eating behaviors. Eating behaviors for both treatment and control groups significantly improved over time. The authors concluded that "it is difficult to demonstrate that increased nutrition knowledge dramatically affects nutrition attitudes and eating behaviors."

## Summary

Since it was established in 1977, the NET program has provided fluctuating support for nutrition education in school classrooms and cafeterias. Programs have been State-defined and have varied considerably across States. Most programs have aimed at improving children's knowledge and attitudes as a means of ultimately influencing their behavior because of assumptions that improved knowledge and/or attitudes will lead to behavior change, because of resource constraints, or because of questions about whether behavioral outcomes constitute an appropriate goal for school-based nutrition education.

Several studies provide compelling evidence that NET nutrition education activities can improve, at least for the short-term, children's nutrition knowledge and attitudes, but there is limited evidence that NET programs affect children's eating habits.

This finding holds true for most school-based nutrition education programs, including programs not sponsored by NET and not based on the KABINS model (Contento et al., 1992). In a comprehensive review of research on school-based nutrition education implemented in the 1980s and early 1990s (most of which was not specifically sponsored by NET), Contento and her colleagues found that, on average, these interventions provided 10-15 hours of instruction over a period of 3-15 weeks. The programs that were most successful, however, tended to include longer (more intensive) interventions. The year-long *Know Your Body* curriculum, for example, has been found to produce not only behavioral changes, but also measurable physiological improvements. The *Food ...Your Choice* curriculum, which includes activities for all grades that can be included in subjects already being taught, has induced elementary students to eat significantly more fruits, vegetables, protein foods, and vitamin-A-containing foods.

The relationship between extended intervention periods and behavioral change is supported by the results of the School Health Education Evaluation (Connell et al., 1985). This nationally recognized study found that 30 hours of classroom instruction were required to achieve "medium" effects for general health practices, 40 hours were required for changes in attitudes, and 50 classroom hours were required to achieve stable levels

in knowledge, attitudes, and behavior across a variety of health areas.

In addition, research has shown that teacher training increases teachers' interest in teaching nutrition, as well as the time they devote to it. Adding parent participation to classroom instruction was found to enhance program impact, particularly in the earlier grades, and particularly if parents and children worked together. Contento and her colleagues (1992) conclude that, in most evaluations of nutrition education programs, "the effectiveness of nutrition education was not given a fair test."

The TN Initiative is well-conceived in building on the NET experience and in incorporating a multi-pronged, theory-driven focus of behavioral change. Results of the pilot implementation project, though preliminary and certainly not generalizable, are promising.

Future research should examine the impact of the TN Initiative in a larger number of schools where the program is firmly established. Examination of program impacts on nutrition-related behaviors should move beyond the self-administered questionnaires and cafeteria observations employed in the evaluation of the TN pilot project to include more sophisticated dietary assessment techniques that will provide information on food and nutrient intake both in and out of school. Given the multi-modal nature of the TN Initiative and the likelihood that students will receive varying "doses" of the program's intervention components, a process study that clearly documents how the program is implemented and, to the extent feasible, the amount of exposure to the program for each child, is also very important.



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