The Pathways study: a model for lowering the fat in school meals1–3

Patricia Snyder, Jean Anliker, Leslie Cunningham-Sabo, Lori Beth Dixon, Jackie Altaha, Arlene Chamberlain, Sally Davis, Marguerite Evans, Joanne Harluy, and Judith L Weber

ABSTRACT

We describe the development and implementation of the Pathways school food service intervention during the feasibility phase of the Pathways study. The purpose of the intervention was to lower the amount of fat in school meals to 30% of energy to promote obesity prevention in third- through fifth-grade students. The Pathways nutrition staff and the food service intervention staff worked together to develop 5 interrelated components to implement the intervention. These components were nutrient guidelines, 8 skill-building behavioral guidelines, hands-on materials, twice yearly trainings, and monthly visits to the kitchens by the Pathways nutrition staff. The components were developed and implemented over 18 mo in a pilot intervention in 4 schools. The results of an initial process evaluation showed that 3 of the 4 schools had implemented 6 of the 8 behavioral guidelines. In an analysis of 5 d of school menus from 3 control schools, the lunch menus averaged from 34% to 40% of energy from fat; when the menus were analyzed by using the food preparation and serving methods in the behavioral guidelines, they averaged 31% of energy from total fat. This unique approach of 5 interrelated food service intervention components was accepted in the schools and is now being implemented in the full-scale phase of the Pathways study in 40 schools for 5 y.

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KEY WORDS Food service, school meals, nutrient guidelines, behavior change, children, fat intake, food preparation, obesity, Pathways study, American Indians

INTRODUCTION

The National School Lunch Program was authorized by Congress in 1946 to “safeguard the health and well-being of the nation’s children” (1) and now serves ≈25 million students daily (2). The National School Lunch Program mandates that lunch provide students with at least one-third of the recommended dietary allowance (RDAs) (3) for energy and selected nutrients. To meet energy and nutrient requirements for breakfast and lunch, the USDA designates separate meal patterns that include servings of milk, meat or meat alternate, fruit or vegetables or both, and bread or grains (6). The serving sizes of these foods are adjusted for age. Before 1994 there were no regulations for total fat or saturated fat.

In 1994 the USDA specified new regulations based on the Healthy Meals for Healthy Americans Act (7) to begin in the 1996–1997 school year. The primary goal of the act was to require that all school meals meet the US Dietary Guidelines for Americans (8) and include ≤30% of total energy from fat, ≤10% of total energy from saturated fat, and at lunch one-third and at breakfast one-fourth of the RDAs for energy, protein, vitamin A, vitamin C, calcium, and iron (9). Fat and saturated fat regulations have now been added to the original school meal regulations (10).

Many studies have documented the existing nutrient content of school meals (11). The School Nutrition Dietary Assessment Study (SNADAS) was a national survey that showed that school lunches in 1992 contained 38% of energy as fat and 15% of energy as saturated fat while meeting or exceeding one-third of the RDAs for energy, protein, vitamin A, vitamin C, vitamin B-6, calcium, iron, and zinc (12, 13). Breakfast contained 31% of energy as fat and 14% of energy as saturated fat. Although energy and zinc contents of the breakfast were slightly lower than the recommendations, all other nutrients met or exceeded the target of one-fourth of the RDAs (14). Other studies, including the Child and Adolescent Trial for Cardiovascular Health (CATCH) (15), Go for Health (16), and the LunchPower! Intervention Study (17), showed the fat content of the baseline school meals to be similar to or higher than...
that reported in the SNDAS. CATCH reported 38.7% of energy from fat, Go for Health reported 46–50% of energy from fat, and LunchPower! reported 39.8% of energy from fat at baseline. CATCH found the other nutrients also met the RDAs (15). The fat content of the school lunches was significantly reduced in all of these studies as a result of the interventions (15–17). Thus, interventions have been successful in reducing the fat in school meals.

The purpose of the Pathways food service intervention was to promote the consumption of food items considered to be healthy, to reduce fat intake, and to comply with current guidelines for school lunch and breakfast. For many children, these meals represent > 50% of their total daily food intake. Thus, an intervention designed to reduce the fat content of school meals could be an effective strategy to lower total dietary fat intake. We describe the development and implementation of the 5 components of the Pathways food service intervention in the 4 pilot schools, discuss the results of initial process evaluation activities, and present a theoretical analysis of existing school menus on the reservations.

FORMATIVE ASSESSMENT

A formative assessment was conducted across all sites before the development of the Pathways intervention, including the food service programs (18). Data gathering included semi-structured interviews of the food service personnel conducted by the Pathways staff and direct observations of school food service resources and practices. Risk behaviors related to food service included children eating high-fat foods, eating second servings of high-fat foods, and drinking whole milk (18). In addition, teachers encouraged children to finish all of their food and children did not consume enough fruit or vegetables. These behaviors were specifically addressed in the development of the food service intervention. Other successful food service programs, including CATCH (19), LunchPower! (17), Trimming the Fat (20), Healthy EDGE (21), and Changing the Course (22), were reviewed for methods of lowering the fat in school meals. Some of these methods were incorporated into the development of the Pathways food service intervention.

FOOD SERVICE INTERVENTION

The Pathways food service intervention was developed collaboratively by the Pathways investigators and nutrition staff and the food service personnel at the 4 intervention schools. The combination of the nutrition skills and production skills of these 2 groups ensured that the intervention’s development and implementation would meet the nutrition goals set and also be relevant to the needs of the food service personnel. Together, these groups identified the potential components needed to develop and implement a food service intervention (Figure 1). After reviewing and discussing the formative assessment data and other food service interventions, the Pathways investigators and nutrition staff and the food service personnel established the following components of the food service intervention: 1) nutrient guidelines, 2) behavioral guidelines, 3) hands-on materials and activities for the food service personnel, 4) training for the food service personnel, and 5) kitchen visits with the school food service personnel by the Pathways nutrition staff. If any school meals included Native American foods, these foods were treated as part of the menu and when needed the fat content was lowered. Some examples were fry bread and wojapi. In addition, Pathways nutrition staff members worked with the curriculum and family intervention staff members on nutrition activities. Pathways nutrition staff members from all 4 study sites were involved in monthly conference calls to begin the development of each component. They conferred extensively with the food service personnel and asked them to review materials for clarity and relevancy.

Pathways food service model

<table>
<thead>
<tr>
<th>Nutrient Guidelines</th>
<th>Behavioral Guidelines</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nutrient goals (primary and secondary)</td>
<td>Eight specific skills to reduce the amount of fat in school meals</td>
</tr>
<tr>
<td>Fat gram guidelines for meals</td>
<td>Application of Guidelines (using social learning theory)</td>
</tr>
<tr>
<td>Fat gram guidelines for food items</td>
<td>Hands-on materials and activities</td>
</tr>
</tbody>
</table>

FIGURE 1. The major components of the Pathways school food service intervention.
Model

Social learning theory is a behavior and theoretical model that is useful for explaining, predicting, and influencing behavior (23). It addresses the psychosocial dynamics underlying behavior and provides strategies to promote behavior change (24). Constructs of social learning theory served as guides in developing the Pathways interventions, including the food service intervention. An aspect of the food service intervention was an emphasis on observational learning (modeling), in which food service personnel first observed the Pathways nutrition staff demonstrating lower-fat food preparation methods at training sessions. The intervention also enhanced behavioral capability, eg, through knowledge and skill acquisition the school food service personnel obtained reinforcement and increased their self-efficacy in preparing and serving lower-fat meals. The environment, defined as factors that are physically external to the person, is another key construct within social learning theory. In the food service intervention, the cafeteria and kitchen environments were modified to provide opportunities to serve lower-fat meals and social support and reinforcement were provided to maintain these practices. Finally, through the development and feasibility testing of the food service intervention, care was taken to ensure the cultural appropriateness and acceptability of all activities.

Nutrient guidelines

The first component of the food service intervention was the Pathways nutrient guidelines for school meals (Table 1). Lowering the fat content, while maintaining adequate energy for growth and development, was targeted as the primary nutrient objective in accordance with the Pathways feasibility study goal of promoting eating behaviors to prevent obesity in American Indian children. Secondary nutrients monitored to ensure adequate intakes were saturated fat, protein, vitamin A, vitamin C, calcium, and iron. The Pathways nutrient guidelines complied with the USDA school meal regulations (7) in both type and quantity of nutrients. The common goal of Pathways and the USDA regulations was that school meals provide an average of ≤30% of total energy from fat for 5 consecutive days. Pathways translated this to a guideline for grams of fat per meal, and then to grams of fat for each type of food used in the meals (Table 2). These nutrient guidelines for foods were then used by the food service personnel to develop and modify recipes and to identify lower-fat vendor products for their school meals. For example, if a manufacturer or broker offered a new pizza product, the food service personnel could compare the amount of fat per serving with the nutrient guidelines for entrées.

TABLE 2
Pathways food-specific guidelines for fat in school meal component

<table>
<thead>
<tr>
<th>Foods</th>
<th>Amount of fat</th>
</tr>
</thead>
<tbody>
<tr>
<td>Entrees</td>
<td>g</td>
</tr>
<tr>
<td>Meat or meat alternate</td>
<td>≤ 12</td>
</tr>
<tr>
<td>Meat or meat alternate with</td>
<td>15</td>
</tr>
<tr>
<td>bread, fruit, or vegetables</td>
<td></td>
</tr>
<tr>
<td>Vegetables or fruit</td>
<td>1</td>
</tr>
<tr>
<td>Salad dressings</td>
<td>3</td>
</tr>
<tr>
<td>Oven-baked fries</td>
<td>3</td>
</tr>
<tr>
<td>Salads</td>
<td>3–5</td>
</tr>
<tr>
<td>Breads, pasta, rice</td>
<td>3</td>
</tr>
<tr>
<td>Quick breads</td>
<td>5</td>
</tr>
<tr>
<td>Snacks</td>
<td>3</td>
</tr>
<tr>
<td>Desserts</td>
<td>5</td>
</tr>
<tr>
<td>Milk and cheese</td>
<td>5</td>
</tr>
</tbody>
</table>

This process gave the food service personnel a practical tool for following the guideline of ≤30% of energy from fat in their weekly meal planning. Energy guidelines were in accordance with the RDA for children aged 7–10 y (3). These were used to calculate the amount of energy from fat and to ensure adequate energy intake while reducing the total fat of the school meals.

Behavioral guidelines

The Pathways food service behavioral guidelines (Table 3) are specific food preparation and skill building behaviors for food service personnel to follow in planning, purchasing, preparing, and serving lower-fat foods in school meals. The behavioral guidelines put the nutrient guidelines into practice and were developed based on data from the Pathways formative assessment, LunchPower! (17), and CATCH (15). The behavioral guidelines identify specific targets to lower the fat in school meals; they include food preparation methods, food product selection, removal of higher-fat foods from the food serving line, and the addition of more low-fat food choices. For example, the behavioral guideline of using low-fat cheese instead of regular

### TABLE 1
Pathways food service nutrient guidelines

<table>
<thead>
<tr>
<th>Nutrient</th>
<th>Lunch guideline: one-third of RDA</th>
<th>Breakfast guideline: one-quarter of RDA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Primary nutrients</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fat (&lt;30% of TE)</td>
<td>22</td>
<td>17</td>
</tr>
<tr>
<td>Energy (kJ)</td>
<td>2782</td>
<td>2092</td>
</tr>
<tr>
<td>Energy (kcal)</td>
<td>665</td>
<td>500</td>
</tr>
<tr>
<td>Secondary nutrients</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Saturated fat (&lt;10% of TE)</td>
<td>7</td>
<td>5.5</td>
</tr>
<tr>
<td>Protein (g)</td>
<td>9</td>
<td>7</td>
</tr>
<tr>
<td>Vitamin A (mg)</td>
<td>233</td>
<td>175</td>
</tr>
<tr>
<td>Vitamin C (mg)</td>
<td>15</td>
<td>11</td>
</tr>
<tr>
<td>Calcium (mg)</td>
<td>267</td>
<td>200</td>
</tr>
<tr>
<td>Iron (mg)</td>
<td>3</td>
<td>2.5</td>
</tr>
</tbody>
</table>

1RDA, recommended dietary allowance (3); TE, total energy.

### TABLE 3
Pathways food service behavioral guidelines

1) Drain and rinse cooked ground meat
2) Offer skim milk and 1%-fat milk
3) Purchase lower-fat vendor products including
   Entrees and main dishes
   Low-fat or nonfat salad dressings
4) Use low-fat cheese
5) Use less or no butter and other fats as you
   Prepare, bake, and serve breads
   Prepare sandwiches
   Prepare rice, noodles, and pasta dishes
   Bake chicken and turkey
   Prepare gravy
   Prepare and serve vegetables
6) Remove butter and other fats from the serving line
7) Offer choices of fruit and vegetables
8) If seconds are served, offer fruit, vegetables, and bread
cheese was found to reduce the fat content by 4 g per 28-g (1-oz) serving. Because some of the schools served seconds of entrées, which increased the fat and energy contents of the meals, another guideline encouraged second helpings of only fruit, vegetables, and grains or breads. The nutrient and behavioral guidelines were coordinated. For example, by draining and rinsing ground meat, food service personnel could prepare ground meat dishes to meet the entrée fat gram guideline while supporting the overall meal guideline of <30% of energy from fat.

Materials

Materials and activities included a variety of new and innovative visual aids with specific step-by-step instructions and motivations for implementing the behavioral guidelines. The goal was to provide detailed information on implementing each guideline in a manner that both was user friendly and fit into the food service operations. The type of material or activity varied with the targeted behavioral guideline. Examples included posters that illustrated the sequential steps of implementing a behavioral guideline, visual demonstrations with jars showing the amounts of fat in specific foods, a video on draining and rinsing cooked ground meat, colorful graphs and charts comparing amounts of fat in typical vendor food products, visual guides illustrating the teaspoons of fat per serving in foods prepared with and without fat, and taste-testing activities. The materials used in the training and school kitchen visits remained in the kitchen as visual reinforcements.

One of the most successful materials was the Pathways “chip jar,” which served as a motivational incentive. At the end of the school work day, the food service staff reviewed the Pathways behavioral guidelines and placed a poker chip in the jar for each guideline they implemented that day. At the end of 3 mo, the kitchen received $0.05 for each chip, with a maximum of $25.00 accrued to purchase something special for the kitchen.

Training

A 2-h training session for food service personnel was held at each site in the fall and winter during the intervention. Each training session emphasized one or more of the behavioral guidelines. The primary focus of the training sessions was to help the food service personnel adopt the nutrient and behavioral guidelines; hands-on activities that allowed the food service personnel to understand and practice the behaviors were used. For the behavioral guideline “Use low-fat cheese,” food service personnel portioned out the amount of grated cheese they usually used in a serving. This amount was then measured and the amount of fat calculated and compared with the amount of fat in a standard serving of cheese. In most cases, the food service personnel were surprised to learn they were serving more cheese, and therefore more fat, than needed. During each training session, food service personnel became more familiar with the nutrient and behavioral guidelines, successfully identified food preparation and serving skills to lower fat content, practiced at least one skill-building technique, and taste-tested at least one lower-fat food.

School kitchen visits

The Pathways nutrition staff visited each intervention school kitchen one day a month and worked side-by-side with the food service personnel to prepare and serve the school meal. This provided an opportunity for the Pathways nutrition staff and the food service personnel to work together on the implementation of specific behavioral guidelines. Visits were often scheduled by the type of foods served that day so that different behavioral guidelines could be implemented on each visit. During the visits, the Pathways nutrition staff reinforced the concepts taught in the training sessions and provided additional supportive materials and activities. Meetings were held for 10–30 min to present and discuss posters and visual materials associated with the behavioral guideline that was the focus of that visit. The Pathways nutrition staff also observed the students during these meals to assess food acceptance.

Curriculum, family, and food service

The Pathways nutrition staff coordinated nutrition-related activities with the Pathways curriculum and family intervention components. For example, the school food service personnel prepared the foods for the classroom snacks that were part of take-home packets used in the curriculum component. Both food service personnel and the Pathways nutrition staff helped to develop menus and prepare and serve meals at events organized for the Pathways family intervention.

METHODS

Process evaluation

During the spring after implementation of the Pathways feasibility study, the Pathways nutrition staff completed a process evaluation at each site to determine the extent to which the food service intervention had been implemented. Using the Pathways food service evaluation form during the course of a day, the Pathways staff noted compliance with the behavioral guidelines by 1) observing the school food service personnel preparing and serving school meals and 2) interviewing the school food service personnel about any behaviors that could not be observed on that day. For example, if ground meat was on the day’s menu, compliance with the guideline of rinsing and draining cooked ground meat could be observed. However, if no ground meat was on that particular day’s menu, the school food service personnel were asked questions about their usual method of preparation.

The results of these assessments showed good compliance overall, with 3 of the 4 schools implementing 6 of the 8 behavioral guidelines. All of the Pathways intervention schools either demonstrated or reported that pasta, rice, noodles, baked chicken or turkey, and vegetables were prepared without adding any fat. Three of the 4 schools demonstrated or reported that cooked ground meat was rinsed and drained, butter was not offered on the serving line, bread was not buttered, and nonfat gravy was served. Half of the schools were purchasing low-fat cheeses and one school offered a choice of fruit and vegetables. One school reported deep-fat frying; however, this was only for French-fried potatoes because students found baked fries to be unacceptable.

Emphasis was given to evaluating the behavioral guideline to offer lower-fat milk. Data were collected regarding the types and amounts of milk purchased before and after 18 mo of the Pathways feasibility study. One school switched from serving only whole milk to 1%-fat milk and another switched from equal amounts of whole and 2%-fat milk to equal amounts of 2%- and 1%-fat milk. The other 2 schools had made only minor changes but had just begun the process of changing milks. Compared with CATCH (15), the amount of food service change in only 18 mo
was on target.

Theoretical menu analysis
To determine how well the nutrient guidelines could be achieved if the Pathways behavioral guidelines were implemented successfully, a theoretical analysis of the nutrient content of 1 wk of breakfast and lunch menus from 3 control schools in the Pathways feasibility study was conducted in April 1996 (Table 4). Comparable data were collected on a fourth school; however, this was an intervention school and only control schools were used as a baseline for this theoretical analysis. The Pathways nutrition staff instructed the school food service personnel how to keep a written record of the actual menus, recipes, and labels of vendor products used for the school meals during the targeted 5-d period. The Pathways staff reviewed all the menu and recipe forms with the food service personnel at the end of the 5-d period for completeness. These menus were analyzed for energy and fat content by using the NUTRITION DATA SYSTEM (NDS) (nutrient database 11A, foods database 25, 93 version 2.8; Nutrition Coordinating Center, University of Minnesota, Minneapolis) (25).

For the first analysis (referred to as “high fat potential”), all foods on the breakfast and lunch menus were entered into the NDS with the highest fat options available but within the food service staff descriptions of each food on the menus. For example, if whole milk and 2%-fat milk were offered on the serving line, only whole milk was entered.

For the second analysis (referred to as “low fat potential”), the same foods from the breakfast and lunch menus were entered into the NDS by using the food preparation and serving methods given in the Pathways behavioral guidelines. For example, if ground meat was offered, it was entered as being rinsed. If whole, 2%-fat, and 1%-fat milk were available at the school, milk was entered as 1%-fat milk.

RESULTS
Results of the theoretical menu analyses are shown in Table 4. When none of the Pathways behavioral guidelines were used (high fat potential), the schools’ menus substantially exceeded the recommendation of ≤30% of energy from fat. At breakfast, 2 of the 3 sites averaged 34% and 40% of energy from fat and at lunch all 3 schools averaged 40% or 45% of energy from fat. In contrast, when all of the behavioral guidelines were implemented (low fat potential), menus were in greater compliance. All sites averaged ≤30% of energy from fat at breakfast and one site did so at lunch. The other 2 sites averaged 32–33% of energy from fat at lunch, for an overall average of 31%.

The behavioral guidelines also affected energy intake. Without any of the behavioral guidelines in place, one site met the USDA regulation for providing ≥2092 kJ (≥500 kcal) at breakfast and 2 sites met the regulation for providing ≥2782 kJ (≥665 kcal) at lunch. When all of the guidelines were used, however, none of the sites met the energy intake criteria at either meal.

DISCUSSION AND CONCLUSION
The Pathways food service model (Figure 1) shows the major components of the food service intervention. Some or all of these components were used in other studies (15–22). For example, some studies used nutrient guidelines and LunchPower! (17) and CATCH (15) translated the guidelines into more practical tools for food purchasing and menu modifications.

A unique feature of Pathways is the development of a comprehensive model with an organized and interrelated set of intervention components. The nutrient and behavioral guidelines form the basis of this model. The materials, trainings, and kitchen visits were designed to help the food service personnel meet the nutrient and behavioral guidelines in their meal preparation. These components gave the food service personnel hands-on experience in behaviors specifically tailored to their food production systems. Pathways also provided at least one specific hands-on activity for each of the behavioral guidelines. Although objectives and protocols were established for each training session and kitchen visit, they were flexible enough to allow the Pathways nutrition staff to adapt them to best meet the needs of the food service personnel in each school. Social learning theory constructs such as social support and enhanced behavioral capability, as well as the incentive of the chip jar, were used to facilitate and sustain behavior change. These components all supported an intervention that was culturally appropriate and was tailored to local needs and issues to ensure involvement of the local food service personnel.

### TABLE 4
Results of the Pathways theoretical menu analysis of menu and recipe data

<table>
<thead>
<tr>
<th>Site</th>
<th>Energy (kJ)</th>
<th>Fat (g)</th>
<th>Percent of energy from fat (%)</th>
<th>Energy (kJ)</th>
<th>Fat (g)</th>
<th>Percent of energy from fat (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Breakfast</td>
<td></td>
<td></td>
<td>Lunch</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>menus</td>
<td></td>
<td></td>
<td>menus</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>High fat potential</td>
<td></td>
<td></td>
<td>Low fat potential</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Site 1</td>
<td>1807 (432)</td>
<td>16.5</td>
<td>34.4</td>
<td>1510 (361)</td>
<td>7.9</td>
<td>19.7</td>
</tr>
<tr>
<td>Site 2</td>
<td>2117 (506)</td>
<td>22.7</td>
<td>40.4</td>
<td>1740 (416)</td>
<td>13.6</td>
<td>29.4</td>
</tr>
<tr>
<td>Site 3</td>
<td>1887 (451)</td>
<td>14.7</td>
<td>29.4</td>
<td>1573 (376)</td>
<td>6.1</td>
<td>14.5</td>
</tr>
<tr>
<td>Total</td>
<td>1937 (463)</td>
<td>18.0</td>
<td>34.7</td>
<td>1607 (384)</td>
<td>9.2</td>
<td>21.2</td>
</tr>
<tr>
<td>Site 1</td>
<td>3088 (738)</td>
<td>33.1</td>
<td>40.4</td>
<td>2648 (633)</td>
<td>20.2</td>
<td>28.7</td>
</tr>
<tr>
<td>Site 2</td>
<td>2255 (539)</td>
<td>24.2</td>
<td>40.4</td>
<td>2012 (481)</td>
<td>17.4</td>
<td>32.6</td>
</tr>
<tr>
<td>Site 3</td>
<td>2950 (705)</td>
<td>35.5</td>
<td>45.3</td>
<td>2439 (583)</td>
<td>20.6</td>
<td>31.8</td>
</tr>
<tr>
<td>Total</td>
<td>2766 (661)</td>
<td>30.3</td>
<td>42.0</td>
<td>2368 (566)</td>
<td>19.4</td>
<td>31.0</td>
</tr>
</tbody>
</table>

1Based on analyses of 1 wk of breakfast and lunch menus from 3 schools, using the NUTRITION DATA SYSTEM (25). For high fat potential, items were entered with the highest fat content used at each particular school; for low fat potential, the fat content recommended in the Pathways guidelines was used. Site averages were not weighted by the number of menus per site.
Process evaluation showed that after only 18 mo of this intervention, food service personnel were adopting many of the behavioral guidelines. Other studies have also shown behavioral changes among food service personnel (15, 17). The theoretical menu analysis showed the nutrient changes that could occur if all behavioral guidelines were adopted. According to results of the theoretical menu analysis, implementation of the Pathways behavioral guidelines would reduce the fat content of school breakfasts and lunches to less than or close to the USDA regulation of ≤30% of energy from total fat.

LIMITATIONS AND IMPLICATIONS

Pathways addressed and overcame several challenges, including language barriers at some sites and great distances between the universities and their partner American Indian schools. Also, research in American Indian communities has often been viewed as one-sided, with benefits to the researchers but few to the studied populations (26). Understandably, it took time and frequent contact for the Pathways nutrition staff to gain the trust of the school food service personnel, and even then, the cooks and managers were unaccustomed to giving feedback on the activities. However, because of the partnerships built between the Pathways nutrition staff and the food service personnel, the support of the local Pathways American Indian staff, and the frequent personal contacts, these barriers were largely overcome.

The data presented here should be considered as preliminary because only 8 schools participated in the feasibility phase. Furthermore, the data on menu analysis are based on theoretical calculations, comparing full implementation of all behavioral guidelines with no implementation, rather than being analysis of actual meals served by these schools before and after the entire intervention. The full-scale study will last 5 y, which has been shown to be the amount of time needed to effect change in a food service intervention (15). Thus, significant progress was made in the pilot intervention in just 18 mo.

The Pathways study is now being implemented in the full-scale phase in 40 schools. The feasibility phase of the food service intervention identified areas in each component that need to be modified. For example, as new food products are introduced, new fat gram guidelines will be established. Because food service personnel responded positively to the materials and activities, this component will also be expanded.

The Pathways model is unique among food service interventions in that it suggests a systematic series of steps for translating overall nutrient goals into specific behaviors, with specific strategies, activities, and materials for the intervention tailored to the school. It acknowledges the need for continuing partnerships between the nutrition staff and the food service personnel and offers a theory-driven model for facilitating and supporting behavior changes. Although the Pathways food service model was developed for a particular cross-cultural project, its focus is on food service operations, making it applicable to a variety of other food service interventions.

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