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The authors would like to acknowledge the administration, staff, and students of the following Project ReFresh schools:

Baltimore County: Bedford, Chapel Hill, Deer Park, Edmondson Heights, Hernwood, Martin Boulevard, Norwood, Powhatan, and Woodmoor Elementary Schools

Garrett County: Accident, Broad Ford, Crellin, Friendsville, Grantsville, Kitzmiller, Route 40, and Rough Glades Elementary Schools

Harford County: Darlington, Forest Hill, George D. Lisby at Hillsdale, Magnolia, North Harford, and Ring Factory Elementary Schools

Kent County: Henry Highland Garnett, Galena, Millington, Rock Hall, and Worton Elementary Schools

Montgomery County: Cannon Road, Galway, and Kemp Mill Elementary Schools

St. Mary’s County: Evergreen, Hollywood, and Leonardtown Elementary Schools

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About Team Nutrition

Team Nutrition is an initiative of the U.S. Department of Agriculture (USDA) Food and Nutrition Service to support the Child Nutrition Programs through training and technical assistance for food service staff, nutrition education for children and their caregivers, and school and community support for healthy eating and physical activity. Nutritious school meals, nutrition education, and a health-promoting school environment play an important role in helping students learn to enjoy healthy eating and physical activity. The goal of Team Nutrition is to encourage students to make food and physical activity choices for a healthy lifestyle through school meals and nutrition education based on the principles of the current Dietary Guidelines for Americans.

About Maryland’s 2010 Team Nutrition Grant

The Maryland State Department of Education (MSDE) administers several of the USDA Child Nutrition Programs, including the National School Lunch Program. The goal of Maryland’s 2010 Team Nutrition Grant was to implement low-cost environmental nudges to encourage elementary students to select more fruits and vegetables with their school lunches. In partnership with University of Maryland Extension (UME), Project ReFresh provided technical assistance and sub-grants to six local school systems to train school food service staff to:

- implement cafeteria changes
- partner with UME to conduct classroom-based nutrition education
- conduct evaluation of student behavior, food service staff perceptions, and staff-student interactions

This project was funded by a 2010 Team Nutrition grant from the United States Department of Agriculture’s Food and Nutrition Service and administered by the Maryland State Department of Education’s School and Community Nutrition Programs Branch in partnership with University of Maryland Extension.

This project has been funded at least in part with Federal funds from the U.S. Department of Agriculture. The contents of this publication do not necessarily reflect the view or policies of the U.S. Department of Agriculture, nor does mention of trade names, commercial products, or organizations imply endorsement by the U.S. Government.

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Project ReFresh is a school-based intervention program aimed at improving nutrition and health decisions among elementary students in Maryland.
Project Overview

This program strives to integrate classroom education with cafeteria improvements that help students choose more fruits and vegetables through the use of environmental nudges to market and promote healthy foods.

A toolkit of cafeteria improvement strategies aims to structure choices in the cafeteria environment; market and promote healthy foods; enhance interactions between cafeteria staff and students; and improve student decision-making in the cafeteria.

A classroom curriculum introduces students to basic nutrition through reading, writing, and math activities integrated into the school curriculum and to provide opportunities to taste new foods. The program’s innovative approach encourages teachers, cafeteria staff, and other role models to become choice architects for children, helping them make nutritious choices and lifestyles changes.

Over the course of the 2011-2012 school year, 34 schools in the state of Maryland participated in the Project ReFresh program. Through a collaboration between the Maryland State Department of Education (MSDE) and University of Maryland Extension (UME), this innovative program enabled partnerships between food service staff, instructional staff, and UME educators. During the 2011-2012 school year, the schools that participated implemented food service staff training, cafeteria improvements, and incorporated classroom nutrition education into the standard academic curriculum in 4th and 5th grade. Because the vast majority of children do not meet the recommended intakes for fruit, vegetable, and whole grain consumption, Project ReFresh focused on helping students choose more fruits, vegetables, and whole grains in their diet through comprehensive, low-cost strategies.

Evaluation of the program's successes are documented in this publication. The program was largely successful in accomplishing its goals, which are documented below.

Goals

- Train staff to structure choices in the cafeteria
- Enhance interactions between food service staff and students
- Promote students’ fruit and vegetable selection in school meals
- Integrate nutrition education into the academic curriculum
- Coordinate nutrition education with cafeteria activities
- Create Extension-school partnerships, including food and nutrition services
How Were Children’s Eating Habits Addressed?

Changes in the Cafeterias

In order to implement the 2010 Team Nutrition Project ReFresh, each of the six participating Local Educational Agencies (LEAs) formed a team that reviewed opportunities to improve each school cafeteria’s nutrition environment. Each LEA team included county health education specialists, food and nutrition professionals, teachers, and University of Maryland Extension educators. The teams decided how to use environmental cues in the cafeteria to make changes concerning how children choose their foods. ReFresh teams developed and implemented a plan to enhance the following:

- structuring of choices in the cafeteria environment
- marketing of school meals to students, parents, and teachers
- promotion of healthy foods in the cafeteria
- interactions between cafeteria staff and students
- nutrition education offered in the cafeteria
- student decision-making in the cafeteria

These changes to the cafeteria nutrition environment were accomplished through nudges. A nudge is an environmental cue or structure that influences people to behave in a certain way. Food service staff were trained on how to make these nudges in their cafeterias to change the environment and promote healthier eating by the students. Below are some specific examples of nudges.

1. Nudge with Facilities and Processes

This could mean changes to the lighting (i.e., spotlights on healthy foods), line layout (i.e., placing healthy foods at the front of the line and near checkouts), cafeteria décor (i.e., signs promoting healthy habits), environment (i.e., allowing children a reward for healthy eating by allowing them to sit in special areas of the cafeteria), and/or service methods (i.e., giving a fruit for every meal rather than making it an option).

2. Nudge with Food

This could mean altering the colors, textures, and shapes of foods, using messages such as fun food facts, offering food specials, and having fun and descriptive names for foods (i.e., “lean mean green beans” or having a theme of “around the world”).
3. Nudge with People

Adults and peers can have a great impact on the food choices of children. Therefore, using **scripts and prompting** (i.e., telling children how much you like the healthy foods), **changes to service methods** (i.e., inviting guest chefs to do special demonstrations), changes to **appearance, attitude, and attention** (i.e., having staff wear chef uniforms), and using **send-home messages** (i.e., to inform parents and children about upcoming selections) you may help nudge children to choose more healthy foods.

4. Nudge with Incentives

Lastly, incentives are a great way to increase the appeal of healthy foods. For instance, cafeterias can implement **non-monetary incentives** (i.e., play a “lucky tray game” and if the student with the tray has chosen a healthy meal they can receive a small prize), **price incentives** (i.e., make healthier foods less expensive), and **payment incentives** (i.e., make less healthy à la carte snacks and desserts cash only).

Classroom Changes – Nutrition Education Curriculum

In addition to the changes made in the cafeteria, Project ReFresh teams integrated nutrition education into 4th and 5th grade classrooms during the 2011-2012 school year. The nutrition education curriculum, ReFresh, can be used in tandem with the Cafeteria Toolkit to enhance children’s opportunities for choosing healthy eating habits.

The classroom-based nutrition education curriculum aimed to increase students’ consumption of fruits, vegetables, and whole grains by increasing their exposure to and knowledge of these foods. The components of the classroom nutrition education were as follows:

- **Four lessons per month**
  1. **A hands-on demonstration/tasting of healthy food item** (i.e., apple cranberry tossed salad)
  2. **Reading about the designated theme and/or specific foods** (i.e., reading a book aloud to the children about the Pilgrim’s first Thanksgiving meal)
  3. **Student journal/activity book**
  4. **A reinforcement activity** (i.e., planning and drawing a picture of a family meal that incorporates the monthly theme)

- **A send home parent newsletter**
- **Morning announcements**
To keep things interesting for the children, each month’s lessons had a special theme:

- **October**: What’s so great about nutrition?
- **November**: Heritage foods and Fall foods
- **December**: Family meals
- **January**: Colors, variety, shopping
- **February**: Water
- **March**: Environment, local foods
- **April**: Whole grains
- **May**: Energy balance

**Implementation**

During the 2011-2012 academic school year, six LEAs in the State of Maryland, which included 34 elementary schools, participated in Project Refresh. The schools were assigned to one of three conditions: Control, Cafeteria Only, or Cafeteria and Classroom Nutrition Education. The assigned condition dictated what aspects of the program were implemented in the schools.

**Control**
- No active changes were made
- 7 Elementary Schools

**Cafeteria Only**
- Changes were only made in the cafeteria to promote healthy eating habits of 4th and 5th graders (i.e., training of food service staff to provide nudges and implement changes in the cafeteria environment)
- 13 Elementary Schools

**Cafeteria & Classroom Nutrition Education**
- Changes were made in the cafeteria to promote healthy eating habits of 4th and 5th graders (i.e., training of food service staff to provide nudges and implement changes in the cafeteria environment)
- In addition, classroom-based education about fruits and vegetables (and other healthy eating habits) were conducted monthly in 4th and 5th grade classrooms
- 14 Elementary Schools
Evaluation

Evaluation of the program was completed through the collection of a variety of measures.

1. **Production Records:** Data collected in cafeterias to monitor the selection of fruit and vegetable items.

2. **Food Service Staff Surveys:** A pen-and-paper survey that food service staff completed prior to implementation of the program and after the completion of the program.

3. **Student Surveys:** A pen-and-paper survey that students completed prior to implementation of the program and after completion of the program.

4. **Nutrition Education Logs:** A record of the classroom-based nutrition education lessons.

5. **Cafeteria Nutrition Environment Observation:** A brief observation of the cafeteria environment conducted prior to implementation of the program and after completion of the program.

6. **Student-Staff Interactions Observation:** A brief observation of the student and staff interactions in the cafeteria conducted prior to implementation of the program and after completion of the program.

Each evaluation measure helped us to better understand what did and did not work from this program. Overall, the program was successful in inspiring healthier eating habits of children, as well as, fostering positive staff opinions about the importance of encouraging children to eat healthier. One of the most inspiring forms of feedback was what was learned about how specific aspects of the program were implemented in each county. Each of the six counties in Maryland utilized **creative** and **unique** methods to allow students, teachers, and food service staff to become engaged and interested in the project. We have detailed these exciting ideas and successes on the following pages.
“Overall the kids loved it! Lots of them were experimenting with new foods at home; asking parents to buy the new things they had tried in the classroom. The lessons and messages were clearly translating in the home.”

5th Grade Teacher, Chapel Hill Elementary
Evaluation

Total Number of Participating Schools: **9**
  - Control: **3**
  - Cafeteria Only: **3**
  - Cafeteria and Nutrition Education: **3**

Successful Activities Included:

1. Facilitating collaboration between food service staff and school faculty including art teachers, music teachers, and librarians.
2. Incorporating foods from taste tests into school lunches the following day.
3. Using posters and signage throughout the school to promote fruit and vegetable selection in the cafeteria as well as at home.
4. Incorporating additional components to the curriculum as desired, such as reading more books and making a farmers’ market commercial.

Baltimore County staff attribute much of the success of the program to the collaboration among staff members. With the help of the art teacher, for example, cafeteria staff dressed up as the fruits or vegetables they were serving on a particular day. By keeping the children engaged they became more excited about nutrition and healthy eating. In one case, teachers reported that students unanimously chose oranges over donut holes for a classroom celebration. The students also chose fruit and vegetable platters instead of chips and cookies for their end of the year picnic. In addition, data from cafeteria records and student surveys suggests that students selected more fruits during lunch and included more fruit and vegetables in their diet due to Project ReFresh.
Posters that advocate eating a variety of fruits and vegetables in Baltimore County.

“\nThe program helped to bring together the entire school community.\n\nProject Director\n
An example of well displayed menu items on the cafeteria service line.
Posters that promote healthy food options close to the point of meal selection.

“My opinion about the ReFresh program? I thought it was awesome! It was nice to have something that wasn’t in a can.”

*Cafeteria Manager,*
*Chapel Hill Elementary*
These student journal entries demonstrate the children’s appreciation for the opportunity to learn about and try new foods. One child reflects on the flavors of each food, describing which ones they liked and which ones they did not like. The other student lists the reasons why they have enjoyed the nutrition education lessons. They describe the activities as “fun” and express that they are looking forward to trying these foods at home.
Nutrition Lessons are the Best Because...

1. We get to learn new ways to keep our body healthy so we can not get sick.

2. Also, I like that we can taste foods that we never tasted so we can eat them at home and they are healthy.

3. Finally, I have fun because we get to be like chefs and make tasty foods.

Thank you,

The resources that were provided to the teachers will be valuable beyond this year! I’m sad we won’t have this program again next year.

5th Grade Teacher,
Chapel Hill Elementary
"It was great to see my staff excited about the Refresh grant and desire to participate in activities."

*Project Director*
Garrett County

Evaluation

Total Number of Participating Schools: 8
Control: 2
Cafeteria Only: 3
Cafeteria and Nutrition Education: 3

Successful Activities Included:

1. Displaying name cards to help students learn the names of fruits and vegetables.
2. Placing fruits and vegetables in unique pans and using attractive display items to attract students’ attention.
3. Involving staff in taste testing with students to encourage trying new fruits and vegetables.
4. Using incentive items and verbal nudges to encourage students to try new foods.

Students in Garrett County were very eager to learn and engage in preparing and tasting new foods, and wrote about their successes in their journals. Students also prepared new recipes at home. In addition, data from student surveys suggests that students made positive changes in their fruit and vegetable eating habits, such as reporting that they ate more fruits and vegetables for lunch. Teachers were able to see the positive impacts from Project ReFresh and noted that the program provided a great opportunity for Garrett County.
Posters advocating a balanced diet and physical activity (running, playing, etc.).

“I love Confetti Spaghetti. I found out whole grain noodles are great!”

5th Grader
I learned that many students had never seen or tasted fruits and veggies that I thought were everyday and commonly eaten foods. 

*Educator*

Á la carte choices for students and of menus that students can use to make their daily food choices.
The thing that I never had before but liked so much was that kiwi. It was so sweet. I absolutely loved it. I want more.

4th Grader
In these student journals, the children write about their taste testing of “Confetti Spaghetti.” The children list the ingredients so they can take the recipe home. Both children remark on how much they enjoyed the foods. One child demonstrates their knowledge of specific health benefits of carrots and black berries.
This was a great experience for our kids. My kids were so much more knowledgeable about what they were eating. They enjoyed learning from Project ReFresh.

Teacher,
Magnolia Elementary School
Harford County

Evaluation

Total Number of Participating Schools:  6

Control:  0
Cafeteria Only:  3
Cafeteria and Nutrition Education:  3

Successful Activities Included:

1. Creating a partnership between Harford County Public Schools Food and Nutrition Office, Food Supplement Nutrition Education (FSNE) in Harford County, and classroom teachers to facilitate the program’s success.
2. Fostering a positive environment by encouraging students to become more adventurous eaters.
3. Providing cafeteria staff with basic information, tools and training to nudge students to choose the most nutritious foods.
4. Using clear plastic containers for food to attract students’ attention.

The students in Harford County enjoyed learning about food safety and food preparation techniques. They also enjoyed trying new foods and new food combinations. Many students requested copies of the recipes so they could make them at home. Teachers noticed that the students began regularly bringing in and eating fruit for their afternoon snack. Parents reported that students requested certain fruit be purchased for meals at home, and many even used the “tasting rules” during home meals. County staff attributed the success of the program to introducing new foods at food tastings and the implementation of cafeteria nudges. The nudges included the intentional placement of fruits and vegetables at various locations along the serving line and posting the names of fruits and vegetables. In addition, data collected in the cafeteria supports that increasing the variety of fruits and vegetables available contributes to an increase in students’ selections of these foods. Data from student surveys also suggests that students ate more fruits and vegetables after the program was implemented.
At Forest Hill Elementary, cafeteria staff noticed the students were consuming an extra 1½ case of fresh fruit per week. Students excitedly presented their fruit and vegetables choices to the cashier to show they had a “rainbow on their tray.”

Darlington Elementary students would proudly declare their fruit or vegetables choice to the cafeteria staff and recite the health fact of the day, read by the school nurse during morning announcements.
These student tasting journals demonstrate the children's reactions to several new foods. The children each have different opinions about the foods. By exposing the children to new foods, they are allowed the opportunity to think about what they like and do not like. Overall, all of the children found that they liked some of the foods that they tried.
My Favorite Foods

First Name:   Last Name, First Letter:
School Name: George D. Listy at Hillside
Date: 1/15/2011
Food Name: Apple
Did you like this food? (circle one)  I like it  It's okay  I do not like it
Explain why you did like or did not like this food:
They were sweet and tart

Date: 11/2/2011
Food Name: Pumpkin Parfait
Did you like this food? (circle one)  I like it  It's okay  I do not like it
Explain why you did like or did not like this food:
It is kind of sweet and tastes like Pumpkin Pie.

Date: 12/7/11
Food Name: Apple Cranberry Salad
Did you like this food? (circle one)  I like it  It's okay  I do not like it
Explain why you did like or did not like this food:
Onions.

Date: 1-1-12
Food Name: Confetti Spaghetti
Did you like this food? (circle one)  I like it  It's okay  I do not like it
Explain why you did like or did not like this food:
No Red peppers. It needs almonds.
At Magnolia Elementary, students learned to look for the “hanging” basket to see which types of fresh fruit were available for lunch each day.
The students and staff at RHES found the salad bar to be their favorite lunch event. I found that children were more apt to consume their vegetables when offered in a setting that appeared more inviting by implementing posters and information given through the ReFresh grant.

*Cafeteria Manager,*
Rock Hall Elementary School (RHES)
Kent County

Evaluation

Total Number of Participating Schools: 5
- Control: 0
- Cafeteria Only: 2
- Cafeteria and Nutrition Education: 3

Successful Activities Included:

1. Presenting FoodPlay, an Emmy-award winning live theatre production that incorporates nutrition education aspects into a fun and engaging show for students, teachers, and administrators.
2. Providing in-service training to all cafeteria staff, as well as, follow up training to managers throughout the school year.
3. Using local and seasonal produce for taste testings and involving the children in the preparation, such as allowing them to husk corn.
4. Offering the foods that students tried during the taste tests on the school lunch menu.

Kent County found that engaging the students was key to their success. They found that students were responsive to the colorful posters and displays, and the verbal nudges from cafeteria staff helped to reinforce the students’ choices. Also key to their success was continued training of staff. They noted that there must be opportunities for managers to share “successes” and ideas regarding how to make cafeterias more inviting to students while exposing them to good nutrition. In addition, data from cafeteria records indicates that students selected more fruit after implementation of Project ReFresh. Student survey data also suggests that more students reported eating fruits and vegetables three times a day or more after implementation of the program.
Trays of fresh fruit displayed in a way to look appealing and be easy for students to select.
I can hardly believe my grandson was eating salad. When are you going to have a salad bar on a regular basis?

*Grandparent of a Student*
A bulletin board with signs promoting a balanced diet located in close proximity to the menu.

“We were so excited to see the students respond to a creative writing activity in which they went into great detail about how much they enjoyed whole wheat cinnamon rolls and whole wheat pizza.”

*Cafeteria Manager, H.H. Garnett Elementary*
The following in an example of completed student journals from Kent County. Note that the journal provided a cross-disciplinary approach to nutrition literacy by testing student knowledge of which foods contain water. In addition to teaching students about how nutritious these foods are, there is a scientific element to educating students about healthy food choices that is demonstrated through this journal entry.

![Red Foods Chart](image)

<table>
<thead>
<tr>
<th>Red Foods</th>
<th>I like it</th>
<th>I don’t like it</th>
<th>Why?</th>
<th>Does it contain water?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Red Pepper Slices</td>
<td>❤️</td>
<td></td>
<td>I don’t like it because it is hot</td>
<td>yes</td>
</tr>
<tr>
<td>Red Pepper Hummus</td>
<td>❤️</td>
<td></td>
<td>I don’t like the taste</td>
<td>yes</td>
</tr>
<tr>
<td>Grape Tomatoes</td>
<td>❤️</td>
<td></td>
<td>I like the taste</td>
<td>yes</td>
</tr>
<tr>
<td>100% Juice</td>
<td>❤️</td>
<td></td>
<td>I like it because it tastes like grape</td>
<td>yes</td>
</tr>
<tr>
<td>Blood Orange</td>
<td>❤️</td>
<td></td>
<td>I don’t like the taste</td>
<td>yes</td>
</tr>
</tbody>
</table>
The students love fresh fruits and vegetables and are always willing to try new foods. The students also love the scored oranges in the plastic bags.

*Satellite Cafeteria Manager III, Galway Elementary School*
Montgomery County

Evaluation

Total Number of Participating Schools: **3**
- Control: **1**
- Cafeteria Only: **1**
- Cafeteria and Nutrition Education: **1**

Successful Activities Included:
1. Holding cooking demonstrations with students and parents after school, with taste testings, handouts, and recipes for participants.
2. Creating a “Principal and Staff Favorite Nutritious Foods” bulletin board.
3. Allowing students to create healthy eating posters to be displayed in the dining area.
4. Using interactive smartboards to allow the students to be more involved during the classroom nutrition education lessons.

Montgomery County staff found that engaging students through attractive and colorful displays was helpful in making the program successful. Incorporating healthy eating décor in the cafeteria, such as displaying faux fruit and vegetables in baskets on the serving line, helped to create a more inviting environment. Schools also created bulletin boards with healthy eating themes and fun food facts. In addition to the cafeteria environment changes, the cooking demonstrations and taste testing were among the most successful activities of the program. In the classroom, nutrition educators found that having two or three students read from their notebooks was a great way to review the previous lesson. Teacher involvement was also important for the success of the program. Teachers were encouraged to model the healthy eating habits their students were learning.
Students taste testing kiwis, asparagus, spinach tortilla and hummus.

An example of a lunch menu in Spanish that lists the calories and fat content alongside each possible food choice.
The staff has been very supportive of the Project ReFresh activities. They commonly refer to the Project ReFresh as ‘the healthy eating program.’

*Wellness Specialist,*  
*Division of Food and Nutrition Services*

*Posters and advertisements for healthy food choices in Montgomery County along with displays of healthy produce.*
These student journal entries show the children’s enthusiasm for healthy foods and diets. They each demonstrate how aspects of the Project ReFresh classroom nutrition education have expanded the children’s understanding of the health benefits of healthy diets and specific foods (i.e., mangos). The children are proud of their dietary changes and excited about the new foods they have tried.

A HEALTHIER ME!

Date: [ ]

I eat whole grain cereal and only drink 100% juice. I eat three meals a day and I have 2 whole grain cracker snacks. I now know Ice cream and things like that are once in a while foods. I drink lots of water now because summer is coming up and I don’t wanna be dehydrated. I really appreciate the Nutrition Classes!
I think this school should have mangoes in the school lunch as a fruit. Mangoes are sweet, healthy, and good for our body. Mangoes help your body in many ways. Farmers should have this in their market. Mangoes give you energy when you play a sport or when you run around at recess. When you eat one.
They were eating snap peas by the handful and asking for more! It was so much fun; the kids are really getting into this thing now!

*Refresh Educator,*
*Evergreen Elementary*
St. Mary’s County

Evaluation

Total Number of Participating Schools: 3
- Control: 1
- Cafeteria Only: 1
- Cafeteria and Nutrition Education: 1

Successful activities:

1. Holding a “MyPlate” art contest, in which students colored a “MyPlate” and gave reasons why it is important to eat fruits and vegetables.
2. Establishing a Book Buddies program, in which older students read food and nutrition related books to younger students and created healthy plates with pictures and crayons.
3. Posting newsletter information for parents on the school system’s website.
4. Involving students and parents in taste testings and teaching heart healthy “MyPlate” tips at school events.

The St. Mary’s County staff emphasized that coordination and cooperation among multiple partners contributed to the success of the program. Classroom activities, food tastings, and cafeteria themes were coordinated to reinforce the same messages and make the intervention more comprehensive. Project directors encouraged involving as many people as possible—including school food services dietitians, art and media teachers, school nurses, cafeteria staff, and parent volunteers. They found that people who were given a stake in making changes were happy to become involved beyond their normal roles. By the end of the program, all those involved recognized the value of the program and saw that the students enjoyed the increased variety of fruit and vegetable options in the cafeteria. Cafeteria staff were even inspired to create their own recipes and order different fresh fruit and vegetables to prepare and serve for school meals. Teachers commented that students were:

- bringing in healthier snacks
- talking about changes they made at home
- making an effort to drink more water
- engaging in more physical activity

The students were excited to share their eating choices and actions for being healthier.
A 4th grade student proclaimed he hated blueberries during the May taste testing and left them on his plate. After telling him that his taste buds change as he ‘matures,’ he decided to try them, and consumed them all with surprising delight.

*Nutrition Educator*
Ready-to-eat packaging and preparation make it easier for children to enjoy these healthy snacks.
The students enjoyed the ReFresh lessons. I have seen an increase in healthful snacks that students bring to school, and they are choosing fruits and vegetables at lunch time as well. In fact, the students decided they wanted the Apple Cranberry Salad Toss for our holiday party. The students also brought in fruits and vegetables to go along with the salad.

5th Grade Teacher, Leonardtown Elementary
These journal entries reflect the key points children gathered after nutrition education lessons about local farmer markets. In these entries, the children indicate their knowledge about the accessibility of fresh foods at the market. One child expresses his enthusiasm for a specific food of choice – strawberries.

**What is your favorite fruit or vegetable?**

Date: 

I would like you to purchase strawberries from a local market. Strawberries is healthy, and kids at home may not have strawberries so they can eat. Strawberries have water and vitamins. Strawberries are easy to get from the local market, and are easy to serve. There are many good things about strawberries, so please go down to the local market and buy some strawberries!
When evaluations were compiled for the state, overall program success was evident.
Statewide Findings

When evaluations were compiled for the state, overall program success was evident. Production records indicated that children selected more fruit and vegetable items in the lunchrooms of schools that implemented Project ReFresh. Furthermore, staff opinions were more positive in those same schools. In addition, students reported eating fruits and vegetables more frequently, and in greater quantities after implementation of the Project ReFresh activities. Below we will discuss the findings from the specific evaluation tools.
Production Records

Cafeteria food service staff were asked to provide production records documenting the number of fruits and vegetables selected in the cafeterias. These records were provided for three points of time during the 2011-2012 academic school year (September, December, and May) to track selection patterns. The records reflect the average student selection for a week of time during the given month.\(^1\)\(^2\) Across the course of the year, rates of fruit and vegetable selection were consistently higher than Control groups overall in schools that were given food service staff training (implementing cafeteria changes) and those schools that also conducted classroom-based nutrition education for students in 4th and 5th grade classrooms. The data indicates that the Project ReFresh food service staff training, cafeteria nutrition environment changes, and classroom-based nutrition education may promote healthier meal choices amongst students.

In addition to tracking the number of fruits and vegetables selected by students, the production records examined whether or not the variety of fruits and vegetables served was related to the actual selection of these items. In other words, if more fruit or vegetable options were offered, did the actual number of fruits and vegetables selected increase? Analyses of the data found that in schools in which some aspect of Project ReFresh program were implemented (those schools in the Cafeteria Only or those schools who received cafeteria changes as well as classroom-based nutrition education), there was a significant association between the variety of vegetables served and the selection of vegetables in the Spring. This association did not exist in schools in the Control condition.\(^3\) These results indicate that offering students different choices (i.e., more variety) of fruit and vegetables, in addition to implementing Project Refresh activities, may increase their selection of these foods.

The average number of fruit and vegetable options served at each point of time are reported in Figure 1 and Figure 2 below.

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\(^1\)When production records were provided for more than one week in a month, the first full-calendar week of the given month's records were averaged.

\(^2\)Kent County's Spring production records (\(n = 5\)) and St. Mary's County Fall, Winter, and Spring production records included staff and student selections in addition to student sales.

\(^3\)The staff selection accounted for 1.92% of the total selection for these schools.

A one-tailed correlational analysis revealed this relationship was significant at the \(p < .05\) level (\(r = .395, n = 21, p = .038\)).
Figure 1.

![Graph](image)

**Note.** This graph depicts the average number of fruit options offered to students each day. The total number of fruit options offered was calculated by adding the number of fruit choices the cafeteria staff reported were available (i.e., if bananas, applesauce, and oranges were the children's choices in a given day, the total fruit choices offered would be equal to three). This number was averaged across a week of time for each point of measurement (Fall, Winter, Spring). Control – Fall (n = 4, \( M = 2.70, SD = 0.42 \)), Winter (n = 2, \( M = 2.10, SD = 0.42 \)), Spring (n = 3, \( M = 1.47, SD = 0.92 \)). Cafeteria Only – Fall (n = 11, \( M = 1.73, SD = 0.44 \)), Winter (n = 6, \( M = 2.27, SD = 1.14 \)), Spring (n = 10, \( M = 2.22, SD = 1.66 \)). Cafeteria and Nutrition Education – Fall (n = 11, \( M = 2.25, SD = 1.15 \)), Winter (n = 5, \( M = 2.08, SD = 0.48 \)), Spring (n = 11, \( M = 2.78, SD = 0.72 \)). A one-way ANOVA was conducted to test for group differences between the intervention conditions with regard to the variety of fruits served at each point in time. A main effect approached significance between groups in the Spring, \( F(2,23) = 3.27, p = .058 \). Post hoc secondary analyses using the LSD method revealed that this mean difference was significant between the “Control” and “Cafeteria and Nutrition Education” groups, \( F(2,23) = 3.27, p = .024 \).
The five most commonly offered fruit items throughout the year were the following ranked by the highest mean number of times offered:

1. **Oranges** \( (M = 4.46, SD = 2.89) \)
2. **Apples** \( (M = 4.15, SD = 2.88) \)
3. **Pears** \( (M = 2.27, SD = 1.48) \)
4. **Peaches or Nectarines** \( (M = 1.88, SD = 1.48) \)
5. **Pineapples** \( (M = 1.50, SD = 1.92) \)

Other commonly offered fruit items not counted for frequency included: applesauce, fruit cup, and mixed or assorted fruits.
The five most commonly offered vegetable items throughout the year were the following (ranked by the highest mean number of times offered):

1. **Carrots** (*M* = 3.61, *SD* = 2.56)
2. **Lettuce or Salad** (*M* = 3.34, *SD* = 3.62)
3. **Tomatoes** (*M* = 1.92, *SD* = 1.44)
4. **Peas, Green Beans, or Lima Beans** (*M* = 1.85, *SD* = 2.07)
5. **Potatoes** (*M* = 1.73, *SD* = 1.82)

Other commonly offered vegetable items not counted for frequency included: baked beans, California blend vegetables, and mixed and assorted vegetables.

**Nutrition Education Logs**

Nutrition education logs were used as a record of completion of classroom-based nutrition education lessons and activities. Teachers in participating classes were asked to document the status of completion of each of the four monthly lessons, the monthly food tasting, and the monthly parent newsletter and morning announcements. Teachers were also asked to indicate any challenges they faced throughout the year regarding implementation of the curriculum and to provide any additional feedback about the program. The nutrition education logs reflect the overall success of the implementation of classroom-based activities.

Overall completion rates of each component are depicted in Figure 3. Data from the logs indicate that teachers completed a majority of the educational lessons each month. All responding teachers across all counties completed at least the first lesson of each month throughout the school year. One teacher commented, “The lessons were great! They were a good length for providing quick lessons that packed a punch. The students learned a lot and enjoyed the lessons.” More than three-quarters of teachers completed the food tastings, making the tastings a successful part of the curriculum. One teacher mentioned that the students “tried new foods that they never would have tried without the program... I was shocked at how many students had never tried a pear before.” Parent newsletters were also sent home monthly; the nutrition education logs indicate that a majority of teachers completed this part of the curriculum. **This data indicates that the classroom lessons, food tastings, and newsletter distributions were successfully carried out in**

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*Please note that tater tots, French fries, or similarly prepared items were not classified as a vegetable due to their poor nutritional quality.*
participating schools across the state. Additionally, teachers generally gave positive feedback regarding implementation of the classroom-based activities and expressed positive opinions of the students’ participation in the classroom nutrition education.

The final component of the classroom-based nutrition education was the morning announcements. Unfortunately, the completion rate for this component was limited. One school noted that they did not have a PA system to broadcast the announcements; however, upon installing the system that they would be able to make the announcements regularly.

Figure 3.

Note. Only schools in the Cafeteria and Classroom Nutrition Education condition were surveyed. Completion rates reflect data received from responding classrooms (n = 35): Harford County (n = 13), Garrett County (n = 1), St. Mary’s County (n = 6), Baltimore County (n = 16), and Montgomery County (n = 5) provided Nutrition Education Logs. Kent County did not provide logs.
Site Visit Observations

In order to evaluate how the cafeteria environment affected students’ healthy food choices, team members conducted site visits at each school. They observed factors such as the placement of nutrition messages throughout the cafeteria and the accessibility of healthy food options. Site visits revealed that in the majority of school cafeterias adults interacted with students while they were in the lunch line, often helping students make healthier food choices. Health and nutrition messages displayed in the cafeterias were often posters of the Food Pyramid. Additionally, posters encouraged physical activity and illustrated how local produce was from Maryland farms. (ex: “Farm to School”). During the Fall of the school year, many cafeterias had healthy options available to students; however, the presentation of menu items prohibited students from seeing their options and the size of food served was not age-appropriate. (i.e., younger children had difficulty eating whole apples or oranges).

Results from the observations at the end of the school year revealed that food service staff had taken extra steps to ensure that healthy foods were both accessible and easier to see (i.e., placing foods in clear containers at eye level). Also, foods were made age-appropriate by cutting them into smaller sizes. In addition, to encourage students’ selection of more nutritious food for lunch, some schools offered incentives such as giving students stickers/prizes if they had fruits and vegetables on their tray.

Quotes from Site Visit Observations

- **St. Mary’s County:** “Almost every child that walked through the line took honeydew and/or cantaloupe. Manager asked students what they were eating and also made sure they had a fruit.”

- **St. Mary’s County:** “Ladies [were] wearing hats and visors with fruits and vegetables and “More Matters” aprons.”

- **Harford County:** “They place pictures of what is going to be served in the line for the day. Each day this is switched. There are pictures of fruit throughout the kitchen and near the line.”

- **Harford County:** “For each child the cafeteria staff held up a cucumber spear and asked if the child wanted it.”

- **Kent Co., Millington ES:** “Cashier gives out stickers for taking fruits and veggies.”
Food Service Staff Surveys

Cafeteria food service staff were asked to complete a pen-and-paper survey prior to implementation of the program and after completion of the program. The surveys gathered information about the following staff opinions:

- the importance of encouraging students to select fruits and vegetables
- their role in serving fruits and vegetables to students
- their confidence and ability to encourage children to eat fruits and vegetables
- the barriers observed when serving fruits and vegetables

Results from the surveys indicate that both before and after implementation of the program, food service staff across the three conditions expressed that it is important to encourage students to eat plenty of fruits and vegetables. Throughout the school year, food service staff also maintained the belief that it is their responsibility to encourage students to choose fruits and vegetables at lunch.

After the implementation of the program, food service staff in the Cafeteria and the Cafeteria and Nutrition Education conditions maintained or strengthened their original belief(s) that:

- children who eat fruits and vegetables at school are healthier than those who do not
- the staff have the ability to encourage students to choose fruits and vegetables

Conversely, food service staff in the control condition became less confident in those same beliefs. These food service staff opinions indicate that the Project ReFresh staff training may promote positive staff opinions that place a high value on the importance of children eating healthy meals at school. These opinions and values may assist staff in promoting fruit and vegetable selection of students.

Furthermore, when compared to the control group, food service staff in the schools receiving cafeteria changes and training were more likely to disagree with the following statements at post-test regarding barriers to serving fruits and vegetables to children:

- “I don't have enough time”
- “Not enough fruits and vegetables to serve”
- “Fruits and vegetables are harder to prepare”
- “Not enough support at the district level”
Since control groups were more likely to agree with these statements, it can be observed that there is an important difference in the opinions of staff who received Project ReFresh training. **These opinions indicate that aspects of the Project ReFresh training may empower staff to find ways to work through potential barriers to serving children fruits and vegetables.**

Finally, food service staff in all conditions disagreed that inadequate training in serving fruits and vegetables was a barrier to serving these foods, and the staff maintained this opinion throughout the program implementation. This indicates that all staff do feel like they are receiving adequate training; however, since results indicate that fruit and vegetable selection was higher overall in the schools in which cafeteria staff were trained in Project ReFresh components, this would suggest that despite their perceptions, those cafeteria staff involved in Project ReFresh were better prepared to encourage healthy eating habits of children.

**Student Surveys**

Students completed a survey that was designed to assess their eating habits before and after participating in the program. The survey asked students a variety of questions about eating habits and preferences for fruits, vegetables, and whole grains. A total of 935 students across the state completed both pre- and post-test surveys. Across the span of the year, approximately two-thirds of the students in the sample reported eating lunch in the school cafeteria.

Analysis from the student surveys conducted before the program’s implementation revealed that that only 14.8% of students reported consuming at least three vegetables on the day before taking the survey. Likewise, only 21.4% reported consuming at least three fruit items the previous day. Even more disconcerting was the observation that approximately one-third (33.4%) of students in the sample **had not consumed any vegetables the previous day.** Furthermore, roughly 20% of the students had **not consumed any fruit on the day previous to the survey's administration.** Not only were students across the state reporting that they were not eating the recommended daily intakes of fruits and vegetables, but a large percentage were not eating any fruits or vegetables at all.
Comparison of these rates were encouraging after completion of the program. While the Control group actually observed an increase in the number of students who were not eating any fruits or vegetables, the students in schools who implemented both cafeteria changes, as well as, classroom nutrition education decreased this number. This means that after implementation of the program, less students were going without fruits and vegetables in their daily diets in those schools in the Cafeteria and Nutrition Education condition. Furthermore, the percentage of students who ate at least three fruits or vegetables on the day prior to measurement increased the most in the Cafeteria and Nutrition Education group. These results indicated the cafeteria changes partnered with the classroom nutrition education may have the most impact on how many fruit and vegetable servings students are eating.

Based on children’s self-report, those students receiving some aspect of the Project ReFresh program were more likely to eat fruits and vegetables consistently for lunch. The children receiving both aspects of the program (cafeteria changes and classroom nutrition education) increased the most in their likelihood to eat fruits and vegetables for lunch. Those children reported that they “always or almost always” or “sometimes” eat fruits and vegetables for lunch at a higher rate after their participation in the program. The Control group improved only slightly for their vegetable consumption and decreased the rate who reported eating fruit always, almost always, or sometimes.

In addition, an important influencing factor on children’s eating habits is their perception of their peers’ behaviors. We asked the students about how many students they thought in their grade were eating fruits and vegetables each day before and after implementation of Project ReFresh. The percentage of students who thought the majority7 of their grade were eating fruits and vegetables increased the most in the Cafeteria and Nutrition Education condition. The percentage of students who thought the majority of their grade ate fruits and vegetables also increased for students in the Cafeteria Only condition, although the increases were more modest. The Control group decreased in these numbers, indicating that the Project ReFresh program may have an influence on how children perceive their peers’ eating habits. It is difficult to determine the specific reasons for this increase; however, we can speculate that it is possible that more children are actually eating fruits and vegetables and/or the children are more aware of these habits and may notice them more than they would otherwise. Like other results from this survey, the most significant improvements were noted in the Cafeteria and Nutrition Education condition, indicating that a combination of both aspects is most helpful for students.

7The calculation of the “majority” was calculated from the number of students that reported that “About half of them,” “Most of them,” or “All of them” ate fruits or vegetables each day (with reference to a question asking how many of their peers ate fruits or vegetables each day).
In addition, students were asked to report their ability to choose to eat fruits and vegetables in the school cafeteria, as well as, their ability to prepare fruits and vegetables at home. There was an increase between the pre-test and post-test in the percentage of students who thought that they could choose to eat fruits and vegetables in the cafeteria in each intervention group. The largest increases were seen in the Cafeteria Only and Cafeteria and Nutrition Education groups, which may be have been influenced by aspects of Project ReFresh program. It is possible that these increases were influenced by changes in the cafeterias that made the environment more encouraging for students.

Figure 4.

![Chart](chart.png)

**Note.** Graph reflects analysis of results from schools where students completed both pre- and post-tests (n = 14). The number of schools who reported both pre- and post- are as follows: Control (n = 2), Cafeteria Only (n = 2), Cafeteria and Nutrition Education (n = 10).

Similar results were found concerning students’ reported ability to prepare fruits and vegetables at home (See Figure 5). All intervention groups had an increase in the percentage of students who thought that they could prepare fruits and vegetables at home, but there was a greater difference in the groups that received one or both portions of Project Refresh than the Control group. It is possible that aspects of Project ReFresh influenced changes in the children’s desire/ability to request fruits/vegetables at home and/or parents awareness of the importance of offering these items at home from communication with the schools through various means (i.e., the monthly newsletters).
Figure 5.

Note. Graph reflects analysis of results from schools where students completed both pre- and post-tests ($n = 14$). The number of schools who reported both pre- and post- are as follows: Control ($n = 2$), Cafeteria Only ($n = 2$) Cafeteria and Nutrition Education ($n = 10$).
Lessons Learned

Throughout the state, nutrition educators, teachers, cafeteria staff and students alike enjoyed and benefitted from their involvement in Project ReFresh. Food tastings, cooking demonstrations, and cafeteria changes were among the most popular and successful parts of the program in many schools. The nutrition education also proved to be a critical component in positively changing children's selection behaviors and perceptions about fruits and vegetables. Materials such as posters and food display containers utilized during this school year's program will continue to be used in the future, and many schools plan to maintain the changes made through Project ReFresh.

The following are summaries of outcomes and recommendations of the various components of the program.

Classroom Nutrition Education

The nutrition education component of Project ReFresh was successfully completed. Teachers and nutrition educators alike expressed that students benefitted from and enjoyed the lessons in the classroom.

1. Most teachers were able to complete the various components of the nutrition education classroom curriculum including classroom lessons, food tastings, and parent newsletters. For teachers who found it difficult to complete the Refresh requirements, they suggested being provided more examples of how to integrate the lessons into current curriculums. In addition, teachers suggested shortening the length of some of the longer lessons.

2. Consistent completion of morning announcements was not as successful as the other components. This may be a target area for improvement in future implementations of Project ReFresh.

3. Preparation for and administering of state testing may account for the lower completion rate of lessons in February and March. Since teachers require additional time to be devoted to this statewide testing requirement, it may be beneficial to revise program curriculum to match this need (i.e., shorter lessons scheduled for those months). In addition, consideration may need to be given to other busy times of the year such as around school vacations and towards the end of the school year.
4. Teachers also thought the lessons could use more active involvement from the students. One suggestion made by teachers included implementing activities where students are able to be physically active.

**Food Service Staff Training**

The food service staff surveys suggest that Project ReFresh made a positive impact on the beliefs of food service staff regarding serving fruits and vegetables to students in the cafeteria. However, there may be a need for improvement in other areas to increase the number of fruits and vegetables served.

1. Food service staff did not express a lack of training as a barrier to serving fruits and vegetables. Most food service staff believed it was both important and their responsibility to serve fruits and vegetables.

2. Food service staff also did not express that fruits and vegetables are harder to prepare, or that there were not enough fruits and vegetables to serve. Therefore, there may need to be a greater focus on exposing children to fruits and vegetables instead of focusing on improving attitudes and training of food service staff.

3. Project ReFresh training may account for the food service staffs’ reported improved ability to encourage students to select fruits and vegetables. Food service staff in schools that received training also reportedly held a more positive opinion of the importance of what children eat at school compared to at home. Training also helped eliminate a lack of time to serve fruits and vegetables as a possible barrier to serving these foods.

4. While district level support reportedly increased in schools with cafeteria changes, a lack of support from parents may be another possible barrier to serving fruits and vegetables. Increased communication and collaboration between food service staff and parents may be an opportunity for growth in implementing Project ReFresh in the future.
5. There were also mixed opinions regarding the high cost of fruits and vegetables as a barrier to serving them. More education about the cost of these foods compared to other foods may be an area of opportunity in the future. The price of fruits and vegetables as a barrier to serving these foods may also be independent of the training provided in the program.

Due to the small sample size, data collected from food service staff should be interpreted cautiously. Greater effort should be made to ensure completion and collection of the food service staff surveys for a more successful evaluation. This may require increased cooperation of various levels of administration on the school and county levels.

**Site Observations**

Cafeteria observations conducted in schools across the state provide insight into the implementation and success of cafeteria changes made through Project ReFresh.

1. Observers found that the lunch menus at some schools included useful information like calorie counts for each food item and even fun nutritional facts. Measures such as this were helpful in promoting healthy eating habits among students.

2. They also found that students were motivated to eat more fruits and vegetables when they were actively involved in the preparation of the food.

3. In order to encourage students to eat healthy, foods were made accessible and placed in areas that students were more likely to pass in the lunch line.

4. Also noted was that while some healthy foods may be less appealing when presented “as is,” by implementing changes such as creative displays and fun names, children were more likely to be interested in fruits and vegetables.

5. With younger children, incentives were also helpful in encouraging healthier food choices (ex: stickers, words of praise, etc.).
Other Feedback

In addition to the data collected from surveys and observations, suggestions regarding future implementation of Project ReFresh were gathered from nutrition educators, teachers, cafeteria staff and administrators. Their suggestions include recommendations in several areas of the project:

**Overall Program Implementation:**

- Foster support and collaboration between administrators, teachers, cafeteria staff, art teachers, school nurses and parents to help implement program activities successfully. Meet before, during and after the school year and communicate frequently. Provide training for school teachers, cafeteria staff and nutrition educators well in advance of teaching. Additionally, emphasize training as an ongoing process, with opportunities for sharing success stories and new ideas.

- Set clear expectations for each person involved in the project. For instance, provide teachers an information sheet with their responsibilities, anticipated amount of classroom time of the lesson, and expected student outcomes. This information will be helpful to ensure completion of program components.

- Provide the newsletters, handouts, etc. for schools where paper and copying is a budgetary or practical issue.

- Consider the unique and/or specific needs of the school community and ensure these needs are incorporated into planning and implementation of program activities.

- Encourage the school to take ownership of the project to help sustain efforts when the project concludes.

**In the Classroom:**

- Remain firm but flexible about scheduled class times. Encourage starting on time by sending reminders to teachers to prepare their students prior to the lesson. Take a few minutes for students to share the new foods they are trying at home and the physical activities they are doing.
• Plan for food allergies and remain as inclusive as possible, such as having a gluten-free or dairy free option during applicable taste testings. Also include the school nurse prior to each lesson to ensure all students with allergies are safely included in the taste testings.

• Encourage teachers to get involved in the program by modeling the healthy eating habits students learn in the program.

• Review previous months' nutrition messages and take-home activities to ensure students retain knowledge of previous topics.

• Review tasting rules each time students taste a food.

• Include students in food preparation to encourage their interest.

• Send recipes home with students.

• Encourage teachers to integrate program goals into their general teaching objectives.

• Make the nutrition classes more active and engaging for students, which creates more student enthusiasm for nutrition.

In the Cafeteria:

• Highlight the importance of the cafeteria staff as essential role models who can foster the education process. Their role is essential as they make decisions about what specific options are available to children; furthermore, they have the ability to directly encourage students to make healthier choices.

• Train cafeteria staff in small increments so that changes can be made gradually. Do not overwhelm staff with too much information at one time! More gradual training ensures that cafeteria staff have time to implement positive changes and see the benefits of this implementation. Ensure that staff concerns about labor time are addressed regarding taste testing. Demonstrate and provide specific ideas may help to foster cafeteria staff's likelihood of implementing program components.
Five Take Away Messages

1. Implement Nutrition Education
   To encourage children to select more fruits and vegetables in the school cafeteria, we should educate our children about these fruits and vegetables. Sometimes, children are hesitant to try new fruits and vegetables because they have never been exposed to them. Other times, children may not be receiving messages that adequately highlight the appeal of these foods.

2. Integrate Nutrition Education into Academic Curriculums
   It is hard to fully engage students in nutrition education when it is only provided in the cafeteria. Critical to the success of nutrition education are the partnerships built with external organizations and the schools. These partnerships will allow nutrition education to be integrated into the classroom as well. In Project ReFresh, this partnership included the University of Maryland Extension personnel.

3. Involve Teachers in Nutrition Education
   Teachers are an integral part of nutrition education. Teachers have the ability to reinforce messages about healthy eating habits to students and encourage them to lead a healthier lifestyle throughout the day.

4. Provide On-Going Taste Testing
   Taste testing, whether in the classroom or in the cafeteria, is an important part of getting kids to try new foods and understand their importance.

5. Build and Work on Partnerships
   Nudging students to select more fruits and vegetables in the cafeteria is a true partnership between food service professionals, teachers, administrators and community partners. Not one group can influence the behaviors of students alone; students need to get these nudges from multiple sources!
Final Thoughts

The Refresh Project is developed at an important time. During school year 2012-2013, schools throughout the nation including Maryland will begin implementing the revised School Meal patterns. These patterns emphasize offering students a variety of fruits and vegetables and whole grain products. The ReFresh project moves beyond what is being offered to students; it shows leaders how they can positively influence the healthy options that children select and consume. Our hope is that other schools can use the Promising Practices in this publication to improve children’s selection of fruits, vegetables and whole grains in the school environment and in other parts of their lives.