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Evaluation of the Healthy Schools Partnership Program 2008 - 2009

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Introduction

Registered dietitians (RD) are the leaders in delivering preventative nutritional services in a variety of health care settings. A healthful diet is key for the promotion and maintenance of optimal nutritional status throughout the lifecycle. Interventions that promote these positive practices are associated with reductions in incidence of obesity and chronic disease.

The Healthy Schools Partnership Program (HSPP) is an innovative intervention that is the first of its kind to integrate RDs into the school environment to positively influence students' dietary behaviors. The purpose of the Healthy Schools Partnership is to develop viable long-term solutions to the youth obesity epidemic through the integration of RD coaches in the school-setting. The focus of the program is to seamlessly integrate nutrition education and coaching into physical education classes, and reinforce these messages with a variety of school nutrition activities, announcements, signage and newsletters throughout the school year.

Evaluation Goals and Objectives

In the Fall of 2008, the University of California, Berkeley Center for Weight and Health initiated a comprehensive evaluation to assess the impact of the Healthy Schools Partnership Program on nutrition knowledge, attitudes and student eating behavior; evidence which is essential for future program development and refinement.

Evaluation objectives were to document the effectiveness of HSPP in 4th, 5th, and 6th grade students in Kansas City, Missouri, in three intervention schools compared to two comparison schools, before and after exposure to the intervention program. The three objectives follow:

Objective 1: To improve student attitudes and knowledge regarding healthy food selection.

Objective 2: To increase student consumption of fruits and vegetables and improve breakfast eating behavior, and improve the nutritional quality of snack foods and beverages consumed.

Objective 3: To identify staff attitudes and perceptions of the program relevant to increasing the reach and dose of the program and the likelihood that the program will be sustained.

Description of the Intervention Program

The Healthy Schools Partnership program was implemented in conjunction with PE4Life, which is a school-based approach to advancing the development of quality,

daily physical education programs for K-12 schools. In the Fall of 2008 the PE4Life program was implemented in five elementary schools across Kansas City, Missouri. These schools were able to adopt the PE4Life program because they had the available resources, space and funding for the necessary equipment. Three of these schools were targeted to receive the HSPP program. In these schools registered dietitian coaches spent 8 weeks in the Fall and 6 weeks in the Spring with the children. The RD services of the HSPP included:

- i. Weekly one-on-one nutritional counseling between students and RD coaches,
- ii. Weekly PE games integrating food and nutrition information,
- iii. Weekly cafeteria promotions of healthy foods,
- iv. Daily announcements that identified healthful choices in the cafeteria, and provided food and nutrition information,
- v. Monthly newsletters for teachers throughout the intervention, and
- vi. One Family Fun Night, which included food and nutrition information.

Table 1. Summary of intervention elements, by school

| School | Intervention Elements |
|---|--|
| Banneker Elementary School | PE class 2xs/wk One-on-one nutrition counseling Cafeteria promotions Daily announcements Monthly newsletters Family Fun Night- 125 families attended; Same night as parent-teacher conferences. |
| George Melcher Elementary School | PE class only offered 1x/wk One-on-one nutrition counseling Cafeteria promotions Daily announcements Monthly newsletters Family Fun Night- 3 families attended |
| Afrikan Centered Education Elementary & Middle Schools | PE class 2xs/wk One-on-one nutrition counseling Cafeteria promotions Daily announcements Monthly newsletters Family Fun Night- 125 families attended |
| Garfield Elementary School | PE class 2xs/wk |
| Gladstone Elementary School | PE class 2xs/wk |

The program elements of the HSPP described, in combination with the physical fitness program PE4Life, were developed to educate and empower school-aged children to make healthier food, nutrition, and physical activity choices in their lives; both at school and at home. Physical activity changes are being evaluated in another study. The focus of this evaluation is to identify changes in food and nutrition outcomes.

Methods

Sample

The evaluation of the Healthy Schools Partnership Program was initiated in the Fall of 2008. Five elementary and middle schools serving grades 4-6 from the Kansas City School District that had not previously participated in the PE4Life Program were invited to participate in this evaluation. All five of the schools implemented the PE4Life program starting in the Fall of 2008. Of the five participating schools, three of these (Afrikan Centered Education (ACE) Elementary and Middle School, George Melcher Elementary School, & Banneker Elementary School) were selected as the intervention schools and received the nutrition intervention from certified Registered dietitians. Two schools, Garfield Elementary & Gladstone Elementary, were selected as the comparison schools.

Criteria for selection of the five schools to participate in the evaluation are listed below.

Criteria established for school's participation in the Evaluation of the Healthy Schools Partnership Program

- The schools had not previously implemented the PE4Life program and were interested in and capable of implementing it in the Fall of 2008. (i.e., Funding was in place to purchase the PE4Life equipment and the school was committed to be a PE4Life school).
- The schools serve grades 4, 5 and 6.
- These grades offer the hot food service without competitive food offerings.
- The schools serve a student population that is at least 75% or more eligible for free and/or reduced lunch.

Informed Consent

Parental consent forms (in English, Spanish and Somalian) were sent home to parents of all 4th, 5th, and 6th grade students at the 5 participating schools. Students who returned signed parental consent forms at baseline were invited to participate in the data collection activities. All participating students were assigned a unique study identification number to link all data collected. At the time of baseline and follow up data collections, a registered dietitian visited the participating classrooms at each school, read the child assent form to those students who returned a parental consent form,

explained the processes for completing student surveys and lunch photographs, and distributed study identification labels (in the form of stickers which were then affixed to the top of each survey and lunch tray). Students were given printed copies of the assent form to take home. Once students signed the forms and returned them to the data collector, they were escorted to their regular lunch period where they participated in the lunch photography study and completed the student survey. Details of these procedures follow.

Measures of student self-reported attitudes, knowledge and behaviors (Objectives 1 and 2)

The student survey was adapted from the Healthy Eating/ Active Communities (HEAC)¹ and Healthy Eating Active Living (HEAL) program evaluations. The HEAC and HEAL surveys have been used to evaluate the attitudes, knowledge and self-reported eating behaviors and opinions of over 30,000 middle school students before and after nutrition interventions. The survey instrument was adapted for younger children in the HSPP with the assistance of the registered dietitians involved in the project. Amendments to the survey were made to reflect the unique curriculum content of the HSPP intervention (See Appendix A: Student Survey).

Student surveys were administered in the cafeteria during the regularly scheduled school lunch period by RDs. Students were informed that all parts of the survey were voluntary, that there were no right or wrong answers and that the surveys were anonymous. Completed questionnaires were sent to the Center for Weight and Health where the data was entered and prepared for analysis.

Measures of observational food behaviors (Objective 2)

Photographs of lunch trays were taken for participating students. Because most (75% or more) of the students qualify for free and reduced price lunches, the majority of lunches photographed were of the school meal rather than home lunches. Lunch menu items varied by school but were relatively similar at baseline and follow-up measurements.

Direct shots of foods selected and subsequently eaten were taken before and after the lunch meal. Each lunch was labeled with a study ID but no names or personal identifiers were included in this part of the evaluation. Registered dietitians, accompanied by interns, took the photographs. Photos were taken with a FujiFilm Fine Pix Z5fd digital camera. This procedure was repeated three times: the first time at baseline (September/October 2008), the second at mid-point (December 2008) and the last time at follow-up (April/ May 2009).

¹ Healthy Eating, Active Communities, Phase 1 Evaluation Findings 2005-2008 is available at http://www.healthyeatingactivecommunities.org/downloads/HEAC_Phase1_Evaluation.pdf.

The photo assessment analysis focused on examining change in fruit and vegetable consumption for three reasons:

- 1) Fruit and vegetable consumption is a key message in the nutrition curriculum;
- 2) Unlike other key nutrition messages regarding snacks, breakfasts and beverages change in fruit and vegetable consumption can be observed during the lunch time meal;
- 3) Fruit and vegetable consumption is associated with lower obesity risk and is considered a marker of a healthful diet.

Vegetables that were evaluated included broccoli & cauliflower, carrots, corn, green beans, lettuce, mixed vegetables, mashed potatoes, scalloped potatoes, and potato wedges. Evaluated fruits include apples, apple juice, bananas, grapes, oranges, canned peaches, canned pears and a cup of strawberries in syrup. Although the majority of the lunches were school-prepared, there were a small number of home-prepared lunches included in the sample. For these items, fruits and vegetables were only considered to be so if they were made of 100% fruit or vegetable (e.g., 100% apple juice, baby carrots). Potato products such as chips were not considered a vegetable even though other potato products in the school meals were included. Plate waste was only evaluated for these food items.

Photo coding utilized a nine point scale: 1- none left; 2- very little left (1/8 left); 3- 1/4 left; 4- 1/2 left; 5- 3/4 left; 6- nearly all left; 7- all left; 8- cannot determine because of food/container; 9- cannot determine because of photo. This scale is similar to the Comstock 6-point scale (Dubois, 1990) but incorporated three additional codes. The coders entered data into an EpiData 3.1 database. The coding team was tested for inter-rater reliability using a second coder to double code every fifth photo set to ensure consistency in coding. When discrepancies occurred, a third coder made the final determination.

While using digital cameras as a research tool is a relatively new evaluation method (Martin et al., 2007; Swanson, 2008; Williamson et al., 2007; Williamson et al., 2004; Williamson et al., 2003; Williamson et al., 2002), studies have tested the validity of the digital photography method against methods of weighed foods as well as estimates from direct visual estimation (Williamson et al., 2002). Both estimations of portion size with digital photography and direct visual estimation have been shown to be highly correlated with actual weights of foods (Williamson et al., 2002). Digital photography tends to be less obtrusive and disruptive in naturalistic settings such as school cafeterias (Williamson et al., 2004). Additionally within a naturalistic setting, it has been shown that there is good agreement amongst observers of photographs with the exception of beverage consumption (Williamson et al., 2004). Visual estimation from digital photographs is a low cost and accurate tool for collecting consumption trends, and works well for meals served in school cafeterias (Swanson, 2008). Digital

photography is a promising addition to traditional survey methods for assessing food behaviors.

Assessment of staff perceptions of the program (Objective 3)

Prior to the final data collection period, staff surveys were distributed to 4th, 5th, and 6th grade teachers, PE teachers, food service staff and principals at each participating school (See Appendix B: Staff Survey). School staff voluntarily completed staff surveys that addressed perceptions about the content and sustainability of the intervention. All surveys were anonymous. Responses were entered into a central database at the Center for Weight and Health.

Timing of the evaluation

The evaluation spanned one academic year of program implementation, which included baseline, mid-point and follow-up data collection periods (See Table 2). During the Fall semester, the intervention was conducted for eight-weeks and the intervention continued for 6 additional weeks in the Spring. While formative data were collected at the end of the Fall semester, this report focuses on the comparison of data between early Fall and later Spring, the period encompassing the full program period.

Table 2. Evaluation timeline

| Month | Activity |
|--------------------------|--|
| August- September 2008 | Protocol design & training of RDs on data collection |
| | Baseline data collection |
| September- November 2008 | Program implementation for 8-weeks |
| | Program monitoring |
| November- December 2008 | Mid-point data collection |
| January 2009 | Data entry and analysis of baseline and mid-point data |
| February- April 2009 | Program implementation resumes for 6 more weeks |
| April- May 2009 | Staff survey data collection |
| | Endpoint data collection |
| June 2009 | Data cleaning and analysis |
| July 2009 | Presentation of findings and completion of final report. |

Results

Demographic characteristics of students

While all schools participating in HSPP were low income, the demographics of students participating in the intervention and comparison schools varied. Seventy five percent of the students participating at the intervention schools were African American, whereas a majority (59%) of the students participating at the comparison schools were Hispanic or Latino/Latina. These differing demographics are not of concern since the variables of interest were change variables. Race/ethnicity is not expected to impact study change outcomes.

There was a high response rate at both data collection points, 81% at intervention schools, and 86% at comparison schools (Table 3).

Table 3. Summary of student survey participation and response rates (%)

| School | # of Students Participating | |
|---|-----------------------------|-----------|
| | Baseline | Follow-up |
| Intervention Schools | | |
| Banneker Elementary School | 110 | 80 |
| | | |
| George Melcher Elementary School | 53 | 44 |
| | | |
| Subtotal | 270 | 218 (81%) |
| Comparison Schools | | |
| Garfield Elementary School | 93 | 73 |
| Gladstone Elementary School | 137 | 125 |
| Subtotal | 230 | 198 (86%) |
| Total Participants | 500 | 416 (83%) |

Student Nutrition Knowledge

There were clear improvements in nutrition knowledge in intervention schools compared with comparison schools. The following observations are noteworthy:

- Baseline knowledge scores were similar between intervention and comparison schools.
- The majority of students at the intervention schools (86%) reported that they learned how to make healthy food choices over the past six months.
- Over half of the students at intervention sites knew that “vary your veggies” meant to vary the color and type of veggies eaten to get the most nutrients. At comparison schools, only 11.7% of students knew this (Table 4).
- Nearly half of the students participating from the intervention schools knew that fruits and vegetables are a good source of fiber, compared with only 17% from comparison schools (Table 4).
- There was an increase in the percentage of students participating from the intervention schools who were able to report that a good way to keep a healthy weight is to balance food and physical activity (from 51.4% to 82.9%) (Table 4).
- From baseline to follow-up, the percentage of students from the intervention schools who knew that the Nutrition Facts label could help identify the serving size in a package nearly doubled (from 24.1% to 54.7%) (Table 4).
- Overall, results from the student surveys documented that there was a statistically significant improvement in nutrition knowledge at the intervention schools as compared to comparison schools ($p < 0.0001$) (Table 5).

Table 4. Nutrition knowledge: Percent of students with correct responses at baseline and follow-up

| Knowledge Constructs | Intervention schools | | Comparison schools | |
|---|----------------------|-----------|--------------------|-----------|
| | Baseline | Follow-up | Baseline | Follow-up |
| 1. Defining a Power Food | 58.4 | 74.4 | 53.3 | 66.2 |
| 2. Identifying healthiest foods | 77.1 | 94.4 | 74.9 | 85.2 |
| 3. Identifying healthy beverages | 66.8 | 88.0 | 65.2 | 73.6 |
| 4. Understanding a Power Food | 73.5 | 90.3 | 73.0 | 71.3 |
| 5. Understanding serving size on labels | 24.1 | 54.7 | 30.8 | 33.0 |
| 6. Identifying a Power Snack | 70.7 | 90.2 | 65.6 | 64.5 |
| 7. Identifying healthy benefit of fruits and vegetables | 17.8 | 47.9 | 16.4 | 17.4 |
| 8. Identifying a way to maintain a healthy weight | 51.4 | 82.9 | 50.0 | 50.5 |
| 9. Understanding the concept of “vary your veggies” | 10.5 | 54.8 | 11.0 | 11.7 |

Table 5. Summary of changes of nutrition knowledge at intervention vs. comparison schools

| | Knowledge Score at Baseline | Knowledge Score at Follow-up | Difference* |
|----------------------|-----------------------------|------------------------------|-------------|
| Intervention Schools | 4.24 | 6.09 | 1.85 |
| Comparison Schools | 4.16 | 4.59 | 0.43 |

* p < 0.0001

Reported change in consumption of selected foods

- Both the intervention and comparison groups reported a decrease in the consumption of French fries from baseline to follow-up (Table 6). The students at the intervention schools decreased to a greater extent ($p < 0.001$).
- For other food items surveyed (Table 6), including fruits and vegetables (green salad, vegetables and fruits), sweets (candy, ice cream and other sweets), chips (not including baked chips), milk, water and 100% fruit juice there were no significant differences in student reported food consumption between intervention and comparison schools.
- Of note is a trend, albeit not significant for students at intervention sites as compared to comparison sites, documenting a positive change in fruits and vegetable intake.

Table 6. Reported change in consumption of selected foods

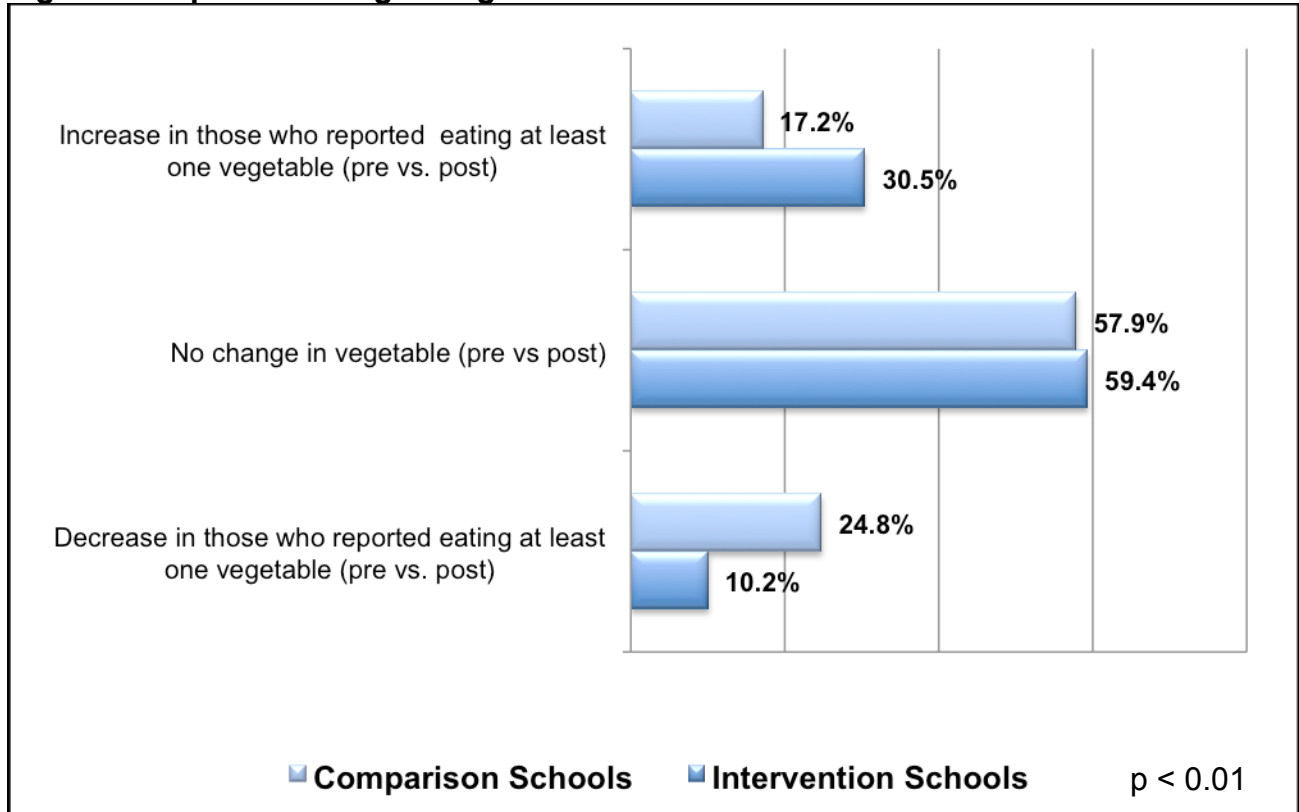
| Types of foods | Intervention | Comparison |
|------------------------|--------------|------------|
| Healthier foods | | |
| Fruits & Vegetables | +0.09 | -0.11 |
| Milk | -0.08 | -0.07 |
| Water | +0.92 | +0.36 |
| 100% Fruit Juice | -0.15 | -0.20 |
| Other foods | | |
| Sweets | -0.36 | -0.33 |
| French Fries* | -0.18 | -0.02 |
| Chips | -0.16 | -0.13 |

* $p < 0.001$

Reported eating of vegetables at school lunch

A separate question asked students about their consumption of vegetables at school lunch on the previous day. There was a statistically significant difference between the intervention schools and the comparison schools in the percentage of students who *reported* eating vegetables with the school lunch from baseline to follow-up. Of 273 students who reported eating school lunch at both data collection points, 30.5% of students at the intervention schools compared with 17.2% of students at the comparison schools reported eating vegetables with school lunch at the follow-up when they had *not* eaten a vegetable at baseline (Figure 1) ($p < 0.01$).

Figure 1. Reported eating of vegetables at school lunch



Student perceptions regarding school meals

- 24.4% of students at the intervention schools believed that school lunch was often healthy and 22.8% thought it was often tasty.
- 22.8% of the students at comparison schools believed that school lunch was often healthy and 21.4% thought it was often tasty.
- There were no statistically significant differences between the intervention schools and the comparison schools regarding student perceptions as to whether the school meals were either healthy or tasty.

Fruits and vegetable consumption at each school from lunch observations

A total of 846 lunches were photographed during the baseline (n=454) and follow-up (n=392) periods. Of these, 692 lunches (at baseline n= 322; at follow-up n= 370; 81.8% of total lunches) had both pre and post photographs for the same individuals (i.e. a matched set). For the analysis of change, we compared the matched pairs of photos for the same students. We identified 162 pairs with the same fruit at baseline and follow-up and 164 pairs with the same vegetable at baseline and follow-up. Our sub-sample for this analysis was 38% of the total sample.

Observations from the food photographs regarding consumption of specific fruits and vegetables

- The photographs illustrate well the types of fruits and vegetables available, their appeal, and the quantities that students consume.
- Contrary to popular belief, many students will eat vegetables on the school lunch tray (see photos below). Studies show that when vegetables are well prepared, promoted, and linked to learning activities, students are more likely to eat them.



- While potatoes are the most popular vegetable consumed, lower fat varieties are also being served at some schools. At the intervention schools, no fried potatoes were served, thus providing students with other more nutritious vegetable options.



- At one of the comparison schools, fried potatoes were served and the quantity eaten increased over the year (see photos on page 15).



One of the criteria for the schools participating in the evaluation was that they offer the hot food service without offering any competitive foods. We looked to see if there was a difference between the intervention schools and comparison schools in regards to meals that had a fruit or vegetable on the plate before consumption. Table 7 describes the percentages of students who had at least one fruit or one vegetable on their plate at both baseline and endpoint.

- The intervention schools served vegetables to a greater percentage of students at follow-up than they did at baseline (+9.5%) whereas the comparison schools served less (-21.8%).

Table 7. Fruits and vegetables on the plate

| On the plate... | Intervention Schools | Comparison Schools |
|-------------------------|----------------------|--------------------|
| 1 fruit at baseline | 70.1% | 79.2% |
| 1 fruit at endpoint | 79.6% | 92.5% |
| Difference | + 9.6% | + 13% |
| 1 vegetable at baseline | 85.5% | 94.6% |
| 1 vegetable at endpoint | 95.1% | 72.8% |
| Difference | + 9.5% | - 21.8% |

Statistics on fruit and vegetable consumption from lunch observations

Examining median change in fruit and vegetable consumption allows us to see potential differences between intervention and comparison schools. While there were pre-post change scores ranging from -1 serving to +1 serving of fruit, the median change for both intervention and comparison schools was 0 (Table 8). The range of median change

scores was -1.88 to 2.0 for vegetables. While the median for comparison schools was 0, the intervention schools had a median score of + 0.13. Individual median data by school is seen in Figures 2a and 2b.

Table 8. Median fruit and vegetable scores with ranges

| | Intervention Schools | Comparison Schools | Range |
|-------------------------------|----------------------|--------------------|---------------|
| Median change fruit score | 0 | 0 | [-1.0 – 1.0] |
| Median change vegetable score | + 0.13 | 0 | [-1.88 – 2.0] |

Figure 2a. Median fruit consumption (pre & post) at each school from lunch observations

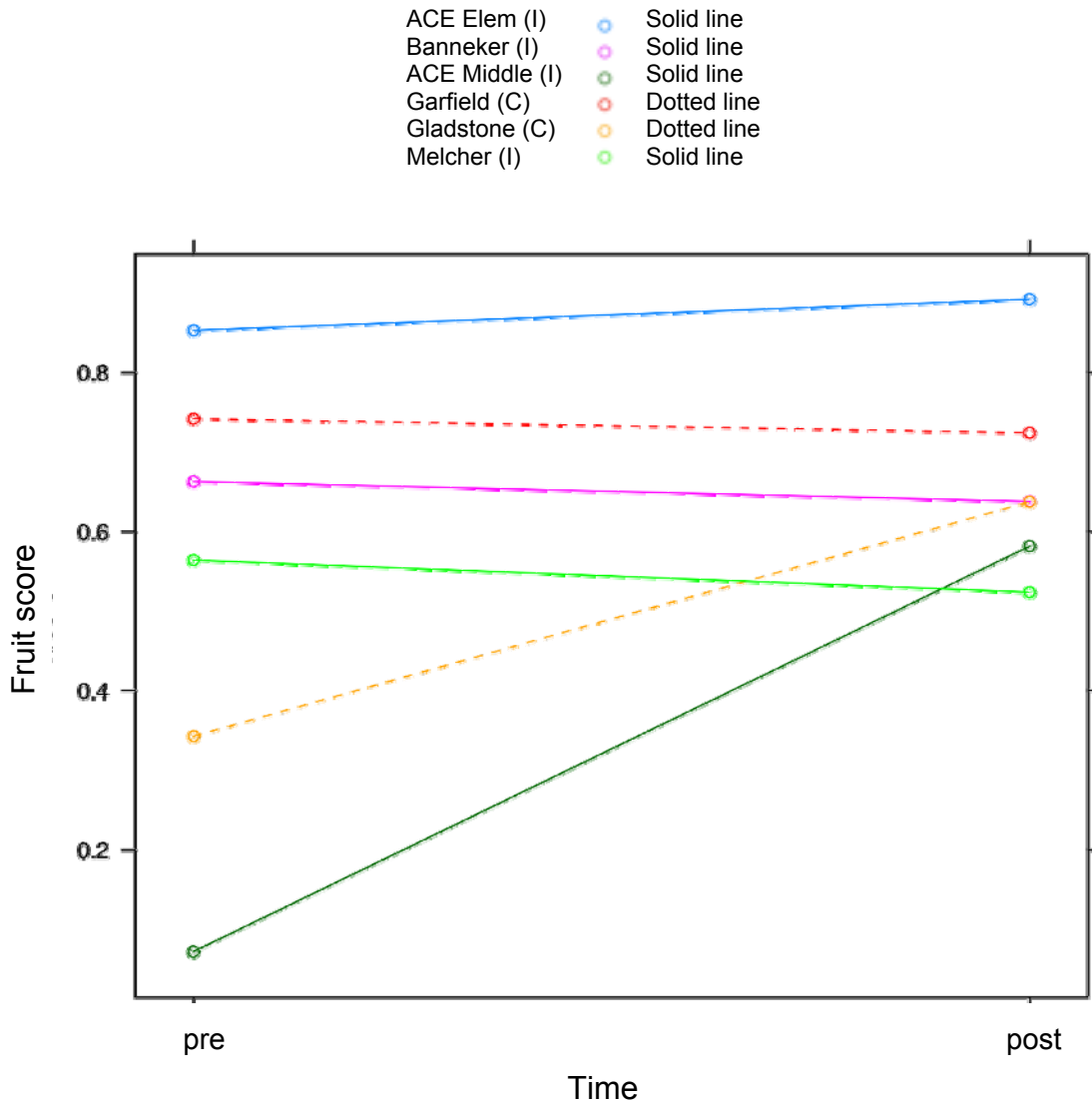
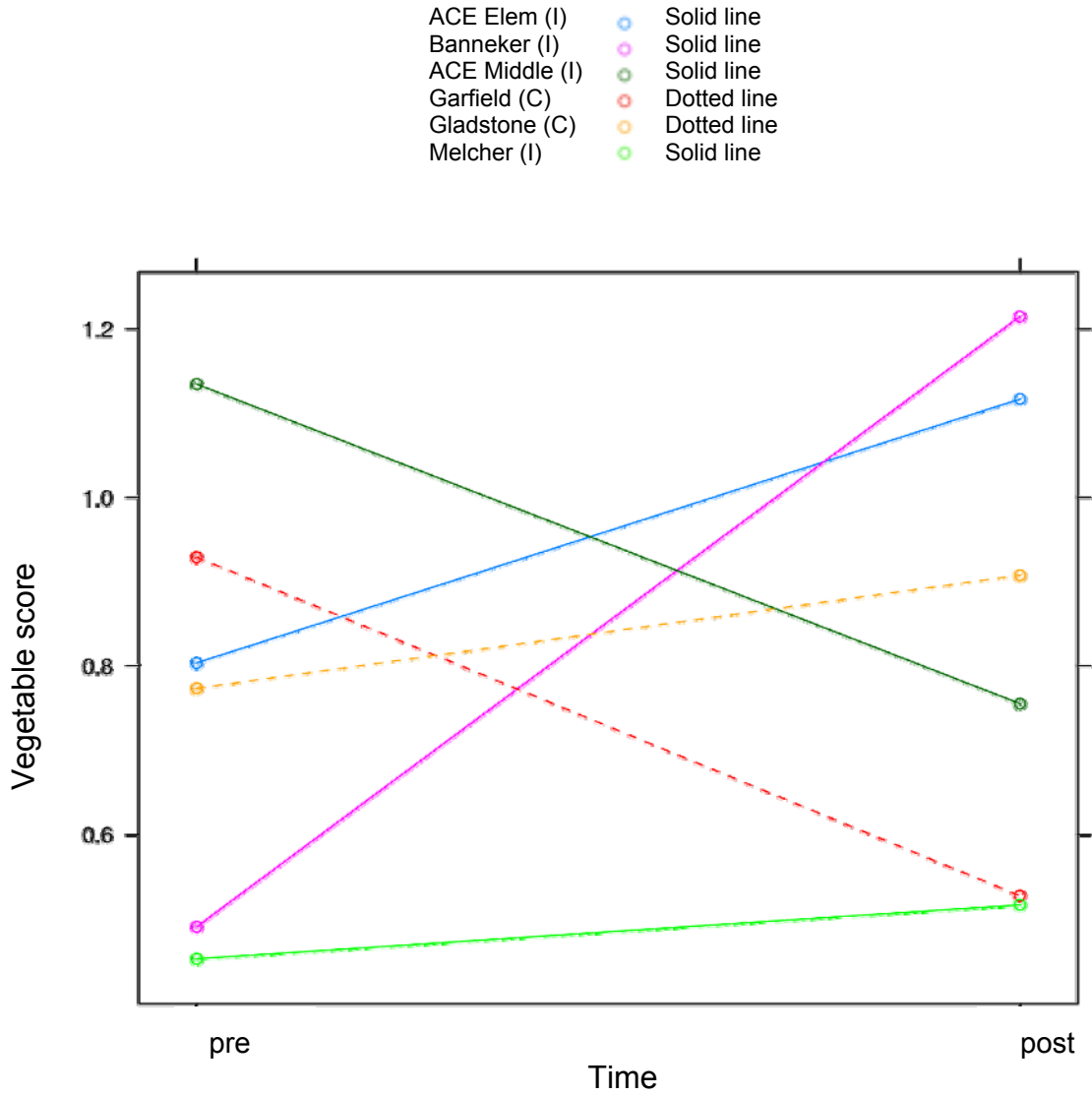


Figure 2b. Median vegetable consumption (pre & post) at each school from lunch observations



Using a paired t-test to test the differences between the pre-mean fruit score at intervention and comparison schools we found no differences in fruit scores, but intake at intervention school found greater change in vegetable (Table 9).

Table 9. Paired t-test

| | Mean at Intervention schools | Mean at Comparison schools | t-test | p value |
|----------------------------|------------------------------|----------------------------|---------|-----------|
| Change in fruit scores | -0.0062 | 0.1188 | 1.6399 | 0.103 |
| Change in vegetable scores | 0.2902 | -0.1656 | -4.0673 | p <0.0001 |

One of the limitations in analyzing mean and median change in fruit and vegetable consumption is the significant number of students not eating any fruits and vegetables at lunch. This bimodal distribution suggests the need for an analysis of change in the numbers of students not eating fruits and vegetables from the pre to post intervention period. This information on non-fruit and non-vegetable consumers provides another way to examine potential effects of the intervention. These changes are illustrated in Figures 3a and 3b.

In one intervention school, the proportion consuming no fruit with school lunch was over 90% at baseline (pre), but decreased to less than 40% at the follow-up (post) measurement. Similarly, at another intervention school, nearly half of students ate no vegetables with school lunch at baseline but this proportion decreased substantially at follow-up measurement (Figure 3b). In the other two intervention schools, the proportion eating no fruit increased slightly, while in one of the comparison schools the proportion eating no fruit decreased substantially from baseline to follow-up. These changes may illustrate the variability in student consumption, or the availability and appeal of what is offered, or they may reflect real differences in the success of schools in implementing the HSPP program.

Figure 3a. Percentage of students observed not eating fruits from lunch photos

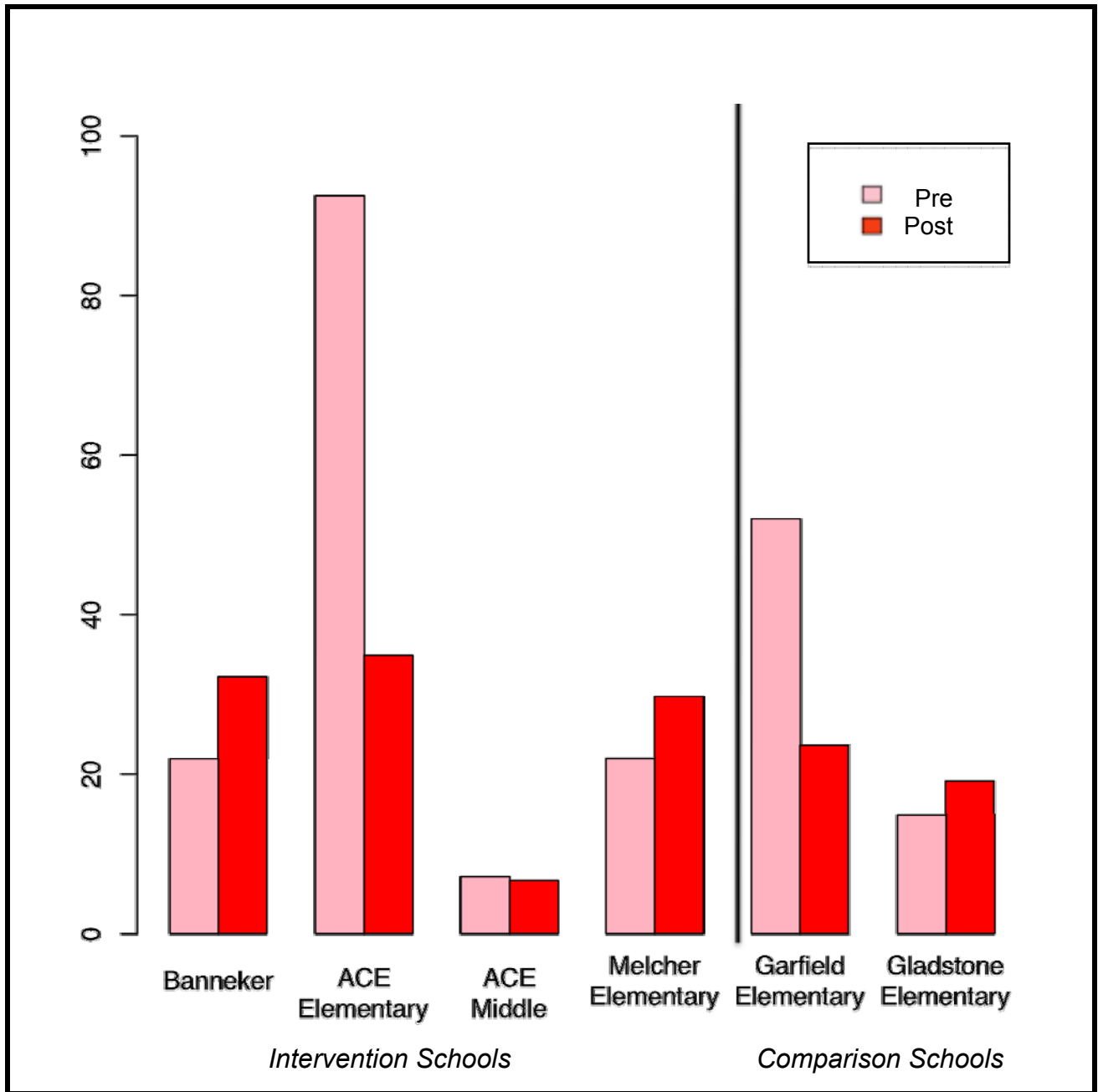
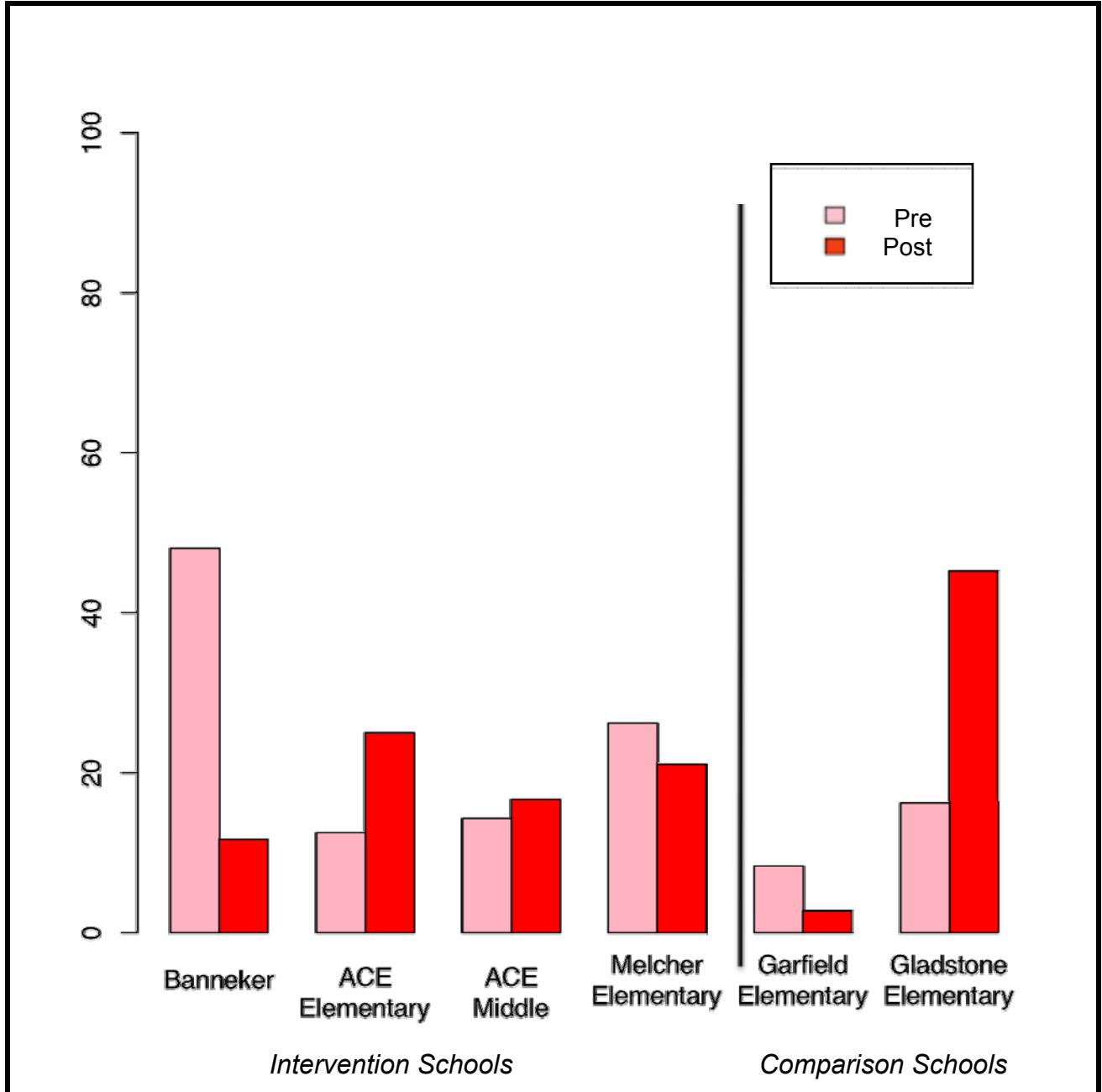


Figure 3b. Percentage of students observed not eating vegetables from lunch photos



School staff feedback on Healthy Schools Partnership Program

Nineteen staff surveys were collected at the 3 intervention schools and eighteen from the comparison schools (n=37). More than half (52.6%) of the staff at the intervention schools have been working at their schools anywhere between one to three years whereas half (50%) of the staff at the comparison school have been working there for more than six years.

Of those who responded at the intervention schools 89% of the schools' staff were aware of the HSPP. Approximately half (47%) of these school staff reported that they believed that the one-on-one RD nutrition coaching was useful. Three-quarters (76%) of school staff participating felt that the RDs were a valuable and knowledgeable resource to have in the schools.

“This program has improved the way we teach health and wellness and is greatly needed to give us resources we can't provide.”
- Staff at Banneker Elementary School

The majority (58%) of staff would like the HSPP expanded to provide staff wellness programs or family nutrition programs at the schools. One staff member from Afrikan Centered Education suggested that, “Teachers [and] educators should possibly be a part of the program to set examples from adults to youth.” Also staff at ACE recommended that the HSPP involve parents more. One teacher expressed that one class a week is not sufficient and suggested that additional nutrition classes would benefit the children.

“This is a program that is desperately needed in the school. If only the RD could be in the classroom a bit longer i.e. 30-40 minutes. The lessons are valuable but not enough time is given to it to ensure complete understanding at 15 minutes.”
- Staff from Melcher Elementary

Nearly all (94 %) of school staff believed that the Healthy School Partnership Program to be a good program for their students.

Healthy School Partnership Program Recommendations

1. Increase the dose and intensity of the key messages from the Healthy Schools Partnership Program.
2. Promote greater fruit and vegetable intake and link this message with experiential learning opportunities.
3. To increase the program's impact and sustainability work on school food policies with food service staff, Parent-Teacher Organizations (PTO) and School Wellness Committees.
4. Work to improve the Healthy Schools Partnership Program's marketing. Continue to find ways to market the program to school stakeholders and participating school staff.
5. Offer a staff wellness program.
6. Identify one local staff person to be responsible for the collection of evaluation data to optimize evaluation results.

Discussion and Conclusion

Based upon the results gleaned from this first evaluation of the Healthy Schools Partnership program we have provided the above recommendations for the next phase of HSPP.

Recommendation 1: Some teachers pointed out that, however valuable, they were concerned that the amount of time that the RDs spent working with the students was not long enough and longer exposure to the curriculum would benefit students. Plans to increase the dose and intensity of the Healthy Schools Partnership should be discussed.

Recommendation 2: As a means of exposing the students to hand-on learning opportunities around healthful eating behaviors, we recommend future programming to include additional experiential learning opportunities. Possible ways to accomplish this are to include RD led food demonstrations in the cafeteria or cooking demonstrations in the classrooms. While the counseling is an important element of the curriculum, studies show that hands-on food experiences such as cooking lessons (Liquori et al, 1998) and monthly tasting events (Goldberg et al., 2009) are promising tactics to improving children's eating behaviors, in particular those of young children. These activities should also highlight the curriculum's key messages like "vary your veggies."

Recommendation 3: This intervention did not address the quality of the foods offered during school meals. In many cases, the RD coaches found the fruits and vegetables served to the students at times to be unappealing. One way to directly address this issue is to work with food service staff, Parent-Teacher Organizations (PTO) and the schools' wellness committees around school food policies.

When school food service personnel express reservations about the HSPP, ways to enhance engagement can be employed. Further when working with the schools' PTO organizations and Wellness Committees, the HSPP can initiate conversations around policies that promote non-food or health promoting student incentives and rewards as well as ways to improve the quality of foods offered.

Recommendation 4: While there were posters in the school cafeterias and newsletters, additional HSPP marketing strategies could be employed. In particular more strategies to engage parents could be developed.

Recommendation 5: Information from staff surveys indicated that teachers value the HSPP, especially the unique expertise that the RDs bring to the schools. Many suggested that they would like to see a staff wellness program. This would provide needed modeling for full school support.

Recommendation 6: It is recommended that a new system be developed to ensure higher participation in future evaluations. Through this evaluation year we experienced a drop from baseline to endpoint in regards to the number of matched pairs, especially for the lunch photograph analysis. For future evaluations it is important that a system is in place to monitor student participation to maximize the number of matched pairs in each school setting. One way to accomplish this task is to identify one staff person who will be responsible for data collection monitoring and documentation. A system like this will only improve the response rates and increase the power of the evaluation to detect meaningful associations. Further, the goal should be to increase the number of schools participating in the intervention and evaluation. This will provide more power for statistical testing including testing of bimodal distributions and cluster analyses.

In summary, results from the evaluation demonstrate the potential of the HSPP, and the value of using registered dietitians to teach nutrition and lead nutrition interventions in the school setting. Continued evaluations conducted in conjunction with the Healthy Schools Partnership Program will serve to provide a solid foundation for the expansion into new and varied school settings.

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Figure 1. Reported eating of vegetables at lunch

Figure 2a. Median fruit consumption at each school from lunch observations

Figure 2b. Median vegetable consumption at each school from lunch observations

Figure 3a. Percent of students observed not eating fruits from lunch photos

Figure 3b. Percent of students observed not eating vegetables from lunch photos

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Appendices

A. Student Survey

Study ID: _____
-/-

Today's Date: __/__/__

Student Survey

Dear Student,

Thank you for taking the time to answer the following questions.

We are interested in learning what you think about nutrition. Please tell us your experiences and opinions. There are no right or wrong answers to any of these questions.

All of your answers are anonymous. We do not want you to write your name on the questionnaire. We hope you will be comfortable answering all of these questions. You may skip any question if you choose to.

PLEASE DO NOT WRITE IN THIS AREA

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30

1. If you ate breakfast or a snack **this morning**, did you eat a fruit with your breakfast or snack?

¹ Yes, I ate a fruit with my breakfast
breakfast
or snack this morning

² No, I did not eat a fruit with my
or snack this morning

³ I did not eat breakfast or a snack this morning

2. Mark the box for **each of the places** where you **ate** the following foods **yesterday**. If you did not eat a certain food, mark the first box, "Did not eat." For each food you ate, please mark one or more answers.

| <u>Yesterday</u> , did you eat... | Did not eat | Ate at school | Ate at home | Ate at some other place |
|--|---------------------------------------|---------------------------------------|---------------------------------------|---------------------------------------|
| a. French fries or other fried potatoes | <input type="checkbox"/> ¹ | <input type="checkbox"/> ² | <input type="checkbox"/> ³ | <input type="checkbox"/> ⁴ |
| b. green salad | <input type="checkbox"/> ¹ | <input type="checkbox"/> ² | <input type="checkbox"/> ³ | <input type="checkbox"/> ⁴ |
| c. vegetables (Do not count salads or fried potatoes) | <input type="checkbox"/> ¹ | <input type="checkbox"/> ² | <input type="checkbox"/> ³ | <input type="checkbox"/> ⁴ |
| d. fruit (Do not count fruit juice) | <input type="checkbox"/> ¹ | <input type="checkbox"/> ² | <input type="checkbox"/> ³ | <input type="checkbox"/> ⁴ |
| e. candy of any kind | <input type="checkbox"/> ¹ | <input type="checkbox"/> ² | <input type="checkbox"/> ³ | <input type="checkbox"/> ⁴ |
| f. breakfast bars, sports bars, granola bars , or other similar kinds of bars | <input type="checkbox"/> ¹ | <input type="checkbox"/> ² | <input type="checkbox"/> ³ | <input type="checkbox"/> ⁴ |
| g. ice cream | <input type="checkbox"/> ¹ | <input type="checkbox"/> ² | <input type="checkbox"/> ³ | <input type="checkbox"/> ⁴ |
| h. other sweets like cake, cookies, donuts, pop-tarts, brownies, sweet rolls, etc. | <input type="checkbox"/> ¹ | <input type="checkbox"/> ² | <input type="checkbox"/> ³ | <input type="checkbox"/> ⁴ |
| i. chips such as tortilla chips, potato chips, corn chips, Cheetos, cheese puffs, or pork rinds (Do not include baked chips) | <input type="checkbox"/> ¹ | <input type="checkbox"/> ² | <input type="checkbox"/> ³ | <input type="checkbox"/> ⁴ |
| j. baked chips, pretzels, crackers , or similar snacks | <input type="checkbox"/> ¹ | <input type="checkbox"/> ² | <input type="checkbox"/> ³ | <input type="checkbox"/> ⁴ |

3. Mark the box for **each of the places** where you **drank** the following beverages **yesterday**. If you did not drink an item at all, mark the first box, "Did not drink." Please mark one or more answers for each beverage.

| <u>Yesterday</u> , did you drink..... | Did not drink | Drank at school | Drank at home | Drank at some other place |
|---|---------------------------------------|---------------------------------------|---------------------------------------|---------------------------------------|
| a. milk | <input type="checkbox"/> ¹ | <input type="checkbox"/> ² | <input type="checkbox"/> ³ | <input type="checkbox"/> ⁴ |
| b. diet drinks (sugar free) , such as diet soda, diet tea, etc. | <input type="checkbox"/> ¹ | <input type="checkbox"/> ² | <input type="checkbox"/> ³ | <input type="checkbox"/> ⁴ |
| c. regular soda or soft drinks | <input type="checkbox"/> ¹ | <input type="checkbox"/> ² | <input type="checkbox"/> ³ | <input type="checkbox"/> ⁴ |
| d. sports drinks such as Gatorade and Powerade | <input type="checkbox"/> ¹ | <input type="checkbox"/> ² | <input type="checkbox"/> ³ | <input type="checkbox"/> ⁴ |
| e. 100% fruit juice , such as orange juice, apple juice or grape juice (Do not count fruit-flavored drinks, Sunny Delight, sports drinks, etc.) | <input type="checkbox"/> ¹ | <input type="checkbox"/> ² | <input type="checkbox"/> ³ | <input type="checkbox"/> ⁴ |
| f. sweetened juice drinks or other sweetened drinks , such as Sunny Delight, Icees, Red Bull, sweetened coffee or tea, Kool-Aid, etc. | <input type="checkbox"/> ¹ | <input type="checkbox"/> ² | <input type="checkbox"/> ³ | <input type="checkbox"/> ⁴ |
| g. water , out of the tap, from a water fountain or from a bottle (or any other unsweetened water) | <input type="checkbox"/> ¹ | <input type="checkbox"/> ² | <input type="checkbox"/> ³ | <input type="checkbox"/> ⁴ |

Please **mark only one** response for questions 4 – 24.

4. Did you eat the school lunch **yesterday**? ¹ Yes ² No

5. If you ate school lunch **yesterday**, did you eat any vegetables with your school lunch?

¹ Yes, I ate a vegetable(s) with my school lunch yesterday

² No, I did not eat a vegetable lunch yesterday

³ I did not eat school lunch yesterday.

6. How often are these statements true in your opinion? Please mark only one response.

| | Always or almost always | Often | Sometimes | Never or almost never | I do not usually eat school meals |
|-------------------------------------|---|------------------------------------|------------------------------------|---------------------------------------|--|
| a. The school lunch is healthy | <input type="radio"/> ¹ | <input type="radio"/> ² | <input type="radio"/> ³ | <input type="radio"/> ⁴ | <input type="radio"/> ⁵ |
| b. The school lunch tastes good | <input type="radio"/> ¹ | <input type="radio"/> ² | <input type="radio"/> ³ | <input type="radio"/> ⁴ | <input type="radio"/> ⁵ |
| c. The school breakfast is healthy | <input type="radio"/> ¹ | <input type="radio"/> ² | <input type="radio"/> ³ | <input type="radio"/> ⁴ | <input type="radio"/> ⁵ |
| d. The school breakfast tastes good | <input type="radio"/> ¹ | <input type="radio"/> ² | <input type="radio"/> ³ | <input type="radio"/> ⁴ | <input type="radio"/> ⁵ |

7. **At home**, how often are these statements true in your opinion? Please mark only one response.

| | Always or almost always | Often | Sometimes | Never or almost never |
|---|--------------------------------------|------------------------------------|------------------------------------|---------------------------------------|
| a. There are healthy snack foods that I like to eat at home | <input type="radio"/> ¹ | <input type="radio"/> ² | <input type="radio"/> ³ | <input type="radio"/> ⁴ |
| b. I eat fruits and vegetables for a snack when I am home | <input type="radio"/> ¹ | <input type="radio"/> ² | <input type="radio"/> ³ | <input type="radio"/> ⁴ |
| c. I eat a fruit or vegetable with meals when I am home | <input type="radio"/> ¹ | <input type="radio"/> ² | <input type="radio"/> ³ | <input type="radio"/> ⁴ |
| d. I eat dinner with my family | <input type="radio"/> ¹ | <input type="radio"/> ² | <input type="radio"/> ³ | <input type="radio"/> ⁴ |
| e. Healthy foods taste good | <input type="radio"/> ¹ | <input type="radio"/> ² | <input type="radio"/> ³ | <input type="radio"/> ⁴ |

8. During the past 6 months at your school, have you learned how to make healthy food choices?

- ¹ Yes, and it was helpful
- ² Yes, but it was not helpful
- ³ No

9. Which of the following is a Power Food?

- ¹ Apple pie
- ² Potato chips
- ³ French fries
- ⁴ Corn

10. Which of the following is the healthiest fruit or vegetable?

- ¹ Candy apple
- ² Fresh strawberries
- ³ Broccoli with lots of butter
- ⁴ Peach cobbler

11. What does "Vary your veggies" mean?

- ¹ Eat very few veggies
- ² Vary the amount of veggies you eat every day
- ³ Vary the color and type of veggies you eat
- ⁴ Eat only raw green and orange veggies

12. Fruits & vegetables are healthy and a good source of what?

- ¹ Protein
- ² Fat
- ³ Fiber
- ⁴ Saturated fat

13. Which of the following is the healthiest drink option?

- ¹ Regular soda
- ² Low-fat milk
- ³ Energy drink
- ⁴ Kool-Aid

14. Which snack is a Power Snack?

- ¹ Chips and soda
- ² Candy bar and juice drink
- ³ Orange and low-fat milk
- ⁴ Granola bar and slushy

16. A Power Food is a food that:

- ¹ Contains over half the calories from sugar
- ² Provides lots of vitamins and minerals without a lot of fat and calories
- ³ Is high in fat
- ⁴ Provides excess calories

17. What is a good way to keep a healthy weight?

- ¹ Skip one or two meals each week
- ² Never eat candy
- ³ Never eat after 6:00 at night
- ⁴ Balance food and activity--eat a little more on days when you are really active and eat a little less on days when you are not so active.

18. A bag of pretzels that is labeled 'Snack Bag' is how many servings?

- ¹ One serving
- ² Two servings
- ³ Check the ingredient list
- ⁴ Check the Nutrition Facts Label

19. Which of the following best describes you? (Mark all that apply)

- ¹ American Indian or Alaskan Native
- ² Asian
- ³ Black or African American
- ⁴ Native Hawaiian or Pacific Islander
- ⁵ Hispanic or Latino/Latina
- ⁶ White
- ⁹⁹ Other: (please describe)_____

20. English is the language used in my home:

- ¹ All of the time
- ² Most of the time
- ³ Some of the time
- ⁴ Rarely

21. What grade are you in?

- ¹ 4th
- ² 5th
- ³ 6th

22. Are you:

1 Female (Girl)

2 Male (Boy)

23. I have learned new things about nutrition from the dietitian.

1 True

2 False

If true, please describe the new things about nutrition you have learned from the dietitian.

24. I have made some better food choices because of what I have learned from the dietitian.

1 True

2 False

If true, please describe these changes.

Thank you so much for completing this survey!

B. Staff Survey

Today's Date : __ / __ / __

Staff Survey

Dear School Staff,

Thank you for taking the time to answer the following questions.

We are interested in learning about the students' food and nutrition curriculum and knowledge. Please tell us your experiences and opinions. There are no right or wrong answers to any of these questions.

All of your answers are anonymous. We do not want you to write your name on the survey. We hope you will be comfortable answering all of these questions. You may skip any question if you choose to.

We think it will take you about 20 minutes to complete this survey.

Thank you for your time.

1. How long have you been working at this school?

- Less than 1 year
- 1-3 years
- 3 1/2 – 6 years
- More than 6 years

2. How informed do you think your students are about how to make healthy food choices
(For example : Knowing about eating plenty of fruits and vegetables & an adequate number of servings of dairy products, and knowing about limiting sweetened beverage and high-fat snacks)
?

- Very informed
- Somewhat informed
- A little informed
- Not informed at all

3. How motivated do you think your students are to make healthy food choices ?

- Very motivated
- Somewhat motivated
- A little motivated
- Not motivated at all

4. Where do you think your students learn about making healthy food choices?

Please mark all that apply.

- At home
- In the cafeteria
- In science class
- In PE class
- In health class
- Somewhere else (please list _____)

5. Has your school been participating in the Healthy Schools Partnership Program in the past few months?

- Yes
- No – **Skip to question #28 on page 7**
- Not sure – **Skip to question #28 on page 7**

If you answered yes to question #5, please answer the following questions about the Healthy Schools Partnership Program.

Please mark only one box for each question.

| What did you think about these parts of the Healthy Schools Partnership Program... | I liked it a lot | I liked it okay | I did not like it | I don't know what this is |
|---|---------------------------------------|---------------------------------------|---------------------------------------|---------------------------------------|
| 6. One-on-one RD (Registered Dietitian) nutrition coaching during PE class ? | <input type="checkbox"/> ₁ | <input type="checkbox"/> ₂ | <input type="checkbox"/> ₃ | <input type="checkbox"/> ₄ |
| 7. Daily announcements ? | <input type="checkbox"/> ₁ | <input type="checkbox"/> ₂ | <input type="checkbox"/> ₃ | <input type="checkbox"/> ₄ |
| 8. Cafeteria promotions ? | <input type="checkbox"/> ₁ | <input type="checkbox"/> ₂ | <input type="checkbox"/> ₃ | <input type="checkbox"/> ₄ |
| 9. Weekly PE games ? | <input type="checkbox"/> ₁ | <input type="checkbox"/> ₂ | <input type="checkbox"/> ₃ | <input type="checkbox"/> ₄ |
| 10. Family Fun Night ? | <input type="checkbox"/> ₁ | <input type="checkbox"/> ₂ | <input type="checkbox"/> ₃ | <input type="checkbox"/> ₄ |
| 11. Articles that were printed in the school's newsletters and sent home? | <input type="checkbox"/> ₁ | <input type="checkbox"/> ₂ | <input type="checkbox"/> ₃ | <input type="checkbox"/> ₄ |
| 12. Posters and signage that reinforced nutrition messages throughout the school and in the cafeteria ? | <input type="checkbox"/> ₁ | <input type="checkbox"/> ₂ | <input type="checkbox"/> ₃ | <input type="checkbox"/> ₄ |
| 13. Power Pick concept in the cafeteria ? | <input type="checkbox"/> ₁ | <input type="checkbox"/> ₂ | <input type="checkbox"/> ₃ | <input type="checkbox"/> ₄ |

14. Were you aware that as a part of the Healthy Schools Partnership Program a Registered Dietitian (RD) was at your school to work with the students ?

- Yes
- No – **Skip to Question 16**

15. What is your general impression of the Registered Dietitians (RD) ?

- They are valuable and knowledgeable resources
- I am not sure what they do, and therefore I do not have an opinion
- I do not find them to be valuable or knowledgeable resources

16. Were you aware that a very important message of the Healthy Schools Partnership Program was to promote Energy Balance between nutrition and physical activity ?

- Yes and I think the students understood this message
- Yes, although I am not sure the students understood this message
- No, I was not aware that was a very important message

17. Another important message was to encourage students to eat Power Foods first. Do you think students understand what a Power Food is ?

- I am positive students know what a Power Food is.
- I am somewhat certain students know what a Power Food is.
- I do not know if students know what a Power Food is.
- I think students do NOT know what a Power Food is.

A different topic was discussed each week of the Healthy Schools Partnership Program. Please answer the following questions about the weekly topics.
Please mark all that apply.

| What did you think about about the weekly topic... | It was an important topic. | It was age-appropriate . | It was an important, topic but could have been improved. * | I am not aware information about this topic was discussed. | It was not important and/or age-appropriate for the students. |
|---|----------------------------|----------------------------|---|--|---|
| 18. Mypyramid ? | <input type="checkbox"/> 1 | <input type="checkbox"/> 2 | <input type="checkbox"/> 3 | <input type="checkbox"/> 4 | <input type="checkbox"/> 5 |
| 19. Portion Control ? | <input type="checkbox"/> 1 | <input type="checkbox"/> 2 | <input type="checkbox"/> 3 | <input type="checkbox"/> 4 | <input type="checkbox"/> 5 |
| 20. Food labels ? | <input type="checkbox"/> 1 | <input type="checkbox"/> 2 | <input type="checkbox"/> 3 | <input type="checkbox"/> 4 | <input type="checkbox"/> 5 |
| 21. Beverage Choices ? | <input type="checkbox"/> 1 | <input type="checkbox"/> 2 | <input type="checkbox"/> 3 | <input type="checkbox"/> 4 | <input type="checkbox"/> 5 |
| 22. Snack Planning? | <input type="checkbox"/> 1 | <input type="checkbox"/> 2 | <input type="checkbox"/> 3 | <input type="checkbox"/> 4 | <input type="checkbox"/> 5 |
| 23. Fruits & Vegetables ? | <input type="checkbox"/> 1 | <input type="checkbox"/> 2 | <input type="checkbox"/> 3 | <input type="checkbox"/> 4 | <input type="checkbox"/> 5 |

* Please provide more information here if you thought a weekly topic needed improvement.

24. What are your general impressions about the Healthy Schools Partnership Program ?

- I think it's a good program
- I think program needs to be improved
- I do not think the program is very valuable
- I do not have an opinion

25. Would you like to see the Healthy Schools Partnership Program expanded to provide any of the following additional services (Please check all that apply) ?

- Staff wellness program
- Family nutrition program
- More nutrition education in the classroom
- Other services, please describe

- No, I do not think the program should be expanded. It's OK the way it is.
- No, I do not think the program should be expanded. I do not think it has been a valuable program.

Please provide additional comments about the Healthy Schools Partnership Program here :

26. In your opinion, do you think the students' **knowledge** of how to make healthy food choices (for example : *eat plenty of fruits and vegetables and an adequate number of servings of dairy products, and limit sweetened beverage consumption and high-fat snacks*) has changed from the time the Healthy Schools Partnership Program began until now ?

- Yes, I think their knowledge has increased a lot
- Yes, I think their knowledge has increased a little
- No, I do not think their knowledge has changed

27. In your opinion, do you think the students are more **motivated** to make healthier food choices (for example : *eat plenty of fruits and vegetables and an adequate number of servings of dairy products, and limit sweetened beverage and high-fat snack consumption*) now than they were before the Healthy Schools Partnership Program began ?

- Yes, I think they are a lot more motivated
- Yes, I think they are a little more motivated
- No, I do not think they are more motivated

28. Please provide any additional comments you have about the food and nutrition at your school.

Thank you so much for your time !