EVALUATION OF EATIQUETTE 360
2017-2018 SCHOOL YEAR

OCTOBER 2018
EXECUTIVE SUMMARY

The Vetri Community Partnership’s Eatiquette 360 is a school–based lunchroom intervention that brings environmental changes to partner schools’ lunch programs, primarily through enhanced scratch–made lunch menus and family style dining. The Research & Evaluation Group at PHMC evaluated Eatiquette 360 at four schools, focusing on the policy, systems and environmental goals of increasing consumption of fresh, real foods; providing usable skills in food preparation; and teaching families to make healthier choices at home. Students completed a survey on fruit and vegetable neophobia and multiple lunch assessments on fruit and vegetable consumption. Kitchen and school staff completed surveys measuring their attitudes about Eatiquette 360 and its impact.

KEY FINDINGS

Overall, students in Eatiquette 360 consumed 57% of their fruit servings and 26% of their vegetable servings. Compared to a fruit consumption benchmark of 43% of a serving and a vegetable consumption benchmark of 29%, Eatiquette students consumed more of their fruits and slightly less of their vegetables. Younger students and those who were more adventurous eaters tended to consume more of their fruits and vegetables. Students at ICS West, who were younger than students at the other schools, were more likely to try the fruits and vegetables, consumed a higher proportion of them and were generally less picky. Outcomes for vegetables, overall, were worse than outcomes for fruits. Students were more averse to trying new vegetables than to trying new fruits, gave vegetables worse taste ratings, were less likely to ask for them to be made at home, and consumed less. In terms of program fidelity, St. James School was the most likely to adhere to having a table captain and a staff person present during lunch period, which was associated with students trying fruits and vegetables during lunch.

RECOMMENDATIONS

- Start Eatiquette with young students
- Focus on attitudes toward fruits and vegetables
- Increase palatability of vegetables and menu variety
- Promote staff participation in Eatiquette 360
- Assess staff concerns about increased plate waste
Overview of Eatiquette 360

Eatiquette 360 is a school-based lunchroom intervention that brings environmental changes to partner schools’ lunch programs, primarily through enhanced scratch-made lunch menus and family style dining. Eatiquette 360 is designed to provide teachable moments for all students whether they participate in school lunch or bring their meals from home. These include:

- Daily chef announcements, featuring ingredients, preparation, nutritional benefits, and portioning;
- Point-of-service signage, to increase student awareness of meal components;
- Increased adult presence in the lunchroom to engage with students, encourage healthy consumption, and promote pro-social behavior; and
- Students leading their peers in family-style dining.

Eatiquette 360 Chef Mentors offer multiple forms of technical assistance. In addition to the environmental changes to the lunchroom and the increased adult interaction, the program includes school-wide newsletters and social media activity to promote a culture of health and wellness, as well as direct education via Eatiquette in the Classroom, which provides hands-on cooking lessons for students and parents/caregivers using the Cooking Matters curriculum. Eatiquette 360 employs a policy, systems and environmental approach to improve nutrition. Its objectives are to:

1) Increase the consumption of fresh, real food;
2) Provide usable skills and lessons in food preparation; and
3) Teach children and families how to learn to make healthier choices both at home and at school.

Evaluation Methods

The Vetri Community Partnership contracted the Research & Evaluation Group (R&E Group) at PHMC to evaluate Eatiquette 360, focusing on its policy, systems and environmental goals.

Goal: Increase consumption of fresh, real food.

Methods: To assess students’ consumption of fresh fruits and vegetables during the lunch period, students completed a short self-report survey on their consumption of fruits and vegetables at lunch, also known as meal assessments. The meal assessments were administered in the spring, immediately following the lunch period. The number of days (meals) during which the survey was administered varied by school and classroom, with the maximum number of possible assessments for a given student ranging from 6 to 8 (Table 3). Student IDs were added to each survey by Vetri staff, using class rosters, so that individual surveys could be linked across meal assessments. To account for variability in student food consumption across meals, average fruit and vegetable consumption was calculated.

The meal assessment measured whether students tried the fruit and vegetable, whether they liked it, how much they ate, and if they would like the item to be prepared at home. Students also indicated if a table captain and/or a school staff person sat at their lunch table during that meal, two important components of the Eatiquette 360 model. Because the evaluation began several months after Eatiquette
360 was implemented, a literature review was conducted to determine appropriate baseline values for fruit and vegetable consumption (benchmarks) to which Eatiquette consumption data could be compared.

Prior to implementation of these meal assessments, students completed a questionnaire on food neophobia, called the Fruit and Vegetable Neophobia Instrument, in which children are asked a series of Likert-scale (1-4) questions about willingness to try new fruits and vegetables. Food neophobia is described as negative attitudes toward and non-acceptance of new foods. Thus, a higher neophobia scale indicates a pickier eater and a lower neophobia score indicates a more adventurous eater. Fruit and vegetables are ranked separately. Students who were less neophobic were predicted to have a higher consumption of fruits and vegetables. This questionnaire was linked to their meal assessments via Student ID. Gender and grade questions were also included in the FVNI form.

**Goal:** Provide usable skills and lessons in food preparation.

**Method:** To determine whether kitchen staff gained new skills in preparing school lunches, kitchen staff completed a survey at the end of the school year. They assessed their beliefs about fresh foods being used in school lunches, efficacy in preparing Eatiquette lunches, job satisfaction, kitchen skills and knowledge, and the impact of Etiquette 360 on their own food shopping and cooking practices.

**Goal:** Teach families to make healthier choices at home.

**Method:** A parent/caregiver feedback form was designed to be implemented following cooking demonstration events. The form determined parents’/caregivers’ opinion of the cooking demonstration, knowledge and skills learned during the event, and the likelihood of their making the recipe at home. Although this instrument was developed, it was not implemented.

**Goal:** Promote a culture of health and wellness.

**Method:** To determine the impact Eatiquette 360 may have had on other aspects of the school and student body, teachers and staff completed a survey on their views of the program. This survey included questions on students’ behavior during and following the lunch period, attendance, peer relationships, and student-teacher relationships. School staff completed this survey at the end of the school year.

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School Profiles

The four schools included in the Eatiquette 360 evaluation were all located in Philadelphia, Pennsylvania. Schools served similar populations of students in terms of race and income. Three out of the four schools were elementary schools and one was a middle school. St. James School began implementing Eatiquette in 2014; the other schools were implementing the program for the first time.

Independence Charter School West (ICS West)

ICS West is a public charter school in Southwest Philadelphia, serving grades K-4. In 2017-18, school enrollment was 415 students, 94% of whom identified as racial or ethnic minorities. The 85% Community Eligibility Provision (CEP) rate, means that the low-income threshold was high enough for all students to receive free lunch without the burden of household applications. ICS West used the pre-plated Eatiquette format in which meals prepared by the school’s food service management company utilizing Vetri Community Partnership recipes were pre-plated for students.

St. James School

St. James School is a faith-based school located in the Allegheny West neighborhood of Philadelphia, serving grades 5-8. It is the smallest out of the four schools in the study, serving 63 children in the 2017-2018 school year. 97% of students identify as black or African American. St. James used the full Eatiquette format in which students passed the dishes around the table and served food for themselves.

Wissahickon Charter School – Awbury and Fernhill

Wissahickon Charter School is a public charter school located in Northwest Philadelphia, serving students in grades K-8. While Awbury and Fernhill are two distinct campuses, demographic characteristics for the school are combined. In the 2016-17 school year, enrollment was 486 children, 95% of whom identified as racial or ethnic minorities. With an 80% CEP rate, all students at both Wissahickon campuses received free lunch. Both campuses used the pre-plated Eatiquette format.

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2 Data for the school profiles came from the schools’ websites; the Philadelphia School District’s web-based dashboard: https://dashboards.philasd.org/extensions/philadelphia/index.html#/ or Great Philly Schools: https://greatphillyschools.org/about

3 https://www.education.pa.gov/Teachers%20-%20Administrators/Food-Nutrition/Pages/Community-Eligibility-Provision.aspx
NEOPHOBIA & MEAL ASSESSMENTS

Students at St. James School, ICS West, Wissahickon Awbury, and Wissahickon Fernhill completed the Fruit and Vegetable Neophobia Instrument (FVNI) during a one-time survey completed prior to the meal assessments to gauge their level of aversion to trying new fruits and vegetables. The FVNI includes nine questions related to fruit and nine questions related to vegetables and each question is rated on a scale from 1 to 4, where a higher score is more neophobic or more averse to trying. On this one-time survey, students were also asked their grade and gender.

After select meals, students at each school, then completed a brief feedback form that asked a series of questions about the fruit and main vegetable they ate that day. Questions included:

- Did a table captain sit at your lunch table today?
- Did an adult sit at your lunch table today?
- Did you taste the VEGETABLE/FRUIT today?
- How much of the VEGETABLE/FRUIT did you eat today?
- What did you think of the VEGETABLE/FRUIT today?
- Will you ask for the VEGETABLE/FRUIT to be made at home?

SAMPLE SIZE

Student Sample
432 Student included in analysis

Meal Assessment Sample
1580 Student included in analysis
Participant Demographics

All students in grades 2, 4, 5, and all students at St. James who were present on assessment days received the neophobia survey and the meal assessment surveys. Student demographic data was collected on the neophobia surveys and was linked to the meal assessment forms via student ID. A total of 432 students were included in this analysis. The sample skewed slightly more female (55%), and toward younger elementary students (43% were 2nd graders). The average number of meal assessments completed varied by school (Table 1).

Table 1. Characteristics of the Student Sample (n=432)

<table>
<thead>
<tr>
<th>School</th>
<th>Grade</th>
<th>% Female (#)</th>
<th>Avg. # of meal assessments/student</th>
</tr>
</thead>
<tbody>
<tr>
<td>ICS West</td>
<td>2nd</td>
<td>58% (71)</td>
<td>5.7</td>
</tr>
<tr>
<td></td>
<td>4th</td>
<td></td>
<td></td>
</tr>
<tr>
<td>St. James School</td>
<td>5th</td>
<td>51% (23)</td>
<td>5.7</td>
</tr>
<tr>
<td></td>
<td>6th</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>7th</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>8th</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wissahickon – Awbury</td>
<td>2nd</td>
<td>55% (34)</td>
<td>3.2</td>
</tr>
<tr>
<td></td>
<td>5th</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wissahickon – Fernhill</td>
<td>2nd</td>
<td>55% (66)</td>
<td>5.9</td>
</tr>
<tr>
<td></td>
<td>5th</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>8th</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>2nd</td>
<td>55% (194)</td>
<td>5.6</td>
</tr>
<tr>
<td></td>
<td>4th-5th</td>
<td>150 (35%)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>6th-8th</td>
<td>98 (23%)</td>
<td></td>
</tr>
</tbody>
</table>

For this report, 2nd grade may be referred to as Lower Elementary, 4th-5th grades as Middle Elementary, and 6th-8th grades as Middle School.

Students completed a total of 2,167 meal assessments across the four schools. Among those, 27% were excluded from analysis due to missing data or because students indicated that they had brought lunch from home, leaving a total of 1,580 assessments in the meal-level analysis sample. Table 2 below shows sample characteristics at the meal assessment level. This sample size is much larger than in Table 1, which refers to a sample where students’ individual data was matched across assessments.

Table 2. Characteristics of the Meal Assessment Sample (n=1,580)

<table>
<thead>
<tr>
<th>School</th>
<th>Grade</th>
<th>% Female (#)</th>
</tr>
</thead>
<tbody>
<tr>
<td>ICS West</td>
<td>2nd</td>
<td>58% (300)</td>
</tr>
<tr>
<td></td>
<td>4th</td>
<td></td>
</tr>
<tr>
<td>St. James School</td>
<td>5th</td>
<td>52% (122)</td>
</tr>
<tr>
<td></td>
<td>6th</td>
<td></td>
</tr>
<tr>
<td></td>
<td>7th</td>
<td></td>
</tr>
<tr>
<td></td>
<td>8th</td>
<td></td>
</tr>
<tr>
<td>Wissahickon – Awbury</td>
<td>2nd</td>
<td>59% (67)</td>
</tr>
<tr>
<td></td>
<td>5th</td>
<td></td>
</tr>
</tbody>
</table>
Fruit and Vegetable Neophobia

Students completed the Fruit and Vegetable Neophobia Instrument (FVNI) during a one-time survey completed prior to the meal assessments to gauge their level of aversion to trying new fruits and vegetables. FVNI scores range from 1 to 4; the higher the value, the more neophobic one is.

Among all students, the average neophobia score was 2.1 for fruit and 2.6 for vegetables. Regardless of grade, school, or gender, students showed more aversion to trying new vegetables compared to new fruits. Students at Wissahickon Fernhill were the most neophobic (most picky) and students at ICS West were the least neophobic (most adventurous) for both the fruits and vegetables.

Male and female students had similar neophobia scores. Female students were slightly more averse (neophobic) to trying new vegetables than male students (Figure 2).
The youngest students (lower elementary) had the lowest neophobia scores for both fruits and vegetables, as they were most adventurous and willing to try new items. Neophobia scores steadily increased with age (Figure 3).

**Meal Assessment Outcomes**

For outcomes in the meal assessment, including and table captain/staff presence, trying the fruit or vegetable, opinion of the item, and desire for the item to be made at home, analysis was calculated at the meal level. On average, students completed 5.6 meal assessments.

**Peer and Adult Role Models**

While St. James had near perfect fidelity with having a table captain and a staff person present at lunch tables, the other schools had a table captain present during about 75% of meal assessments and a staff person present at one-third of meal assessments. Having both a table captain and a staff person present at the lunch table was the least common among these three schools and ranged from 21% to 26% (Figure 4).
Trying Fruit and Vegetables

Students were more likely to try the fruits than the vegetables. Depending on the school, students tried fruits during 61% to 76% of meals and tried vegetables at 34% to 43% of meals. St. James and ICS West had the highest percentages of students trying the fruits and vegetables, while Wissahickon Fernhill had the lowest (Figure 5).

Analysis was conducted to determine whether the presence of a table captain or an adult at the lunch table were associated with students’ trying their fruits and vegetables. There was a strong positive association between having adults present at the lunch table and students’ trying vegetables and a moderate positive association between table captain presence and trying vegetables. In other words, students are much more likely to try their vegetables when a staff person is at their table. There was no association between staff presence and students trying fruit, but there was a strong, positive association between table captain presence and students trying fruits. These relationships underscore the importance of peer and adult role modeling and suggest that adhering to these program elements will increase students’ willingness to try fruits and vegetables, which can likely impact consumption.
Opinions of Fruit and Vegetables

Fruits were generally well-liked by students. “Yum” ratings of the fruits ranged from 43% (Wissahickon Fernhill) to 80% (ICS West) (Figure 6). The vegetables were not as well-liked as the fruits, as “yum” ratings ranged from just 12% (Wissahickon-Fernhill) to only 26% (ICS West) (Figure 7). These patterns in opinions of fruits and vegetables mirror the neophobia scores.

Figure 6. Student Rating of the Fruit Taste

- St. James: Yum 57%, Ok 27%, Yuck 16%
- ICS West: Yum 80%, Ok 14%, Yuck 7%
- Wissahickon Fernhill: Yum 43%, Ok 31%, Yuck 26%
- Wissahickon Awbury: Yum 65%, Ok 12%, Yuck 23%

Figure 7. Student Rating of the Vegetable Taste

- St. James: Yum 15%, Ok 37%, Yuck 52%
- ICS West: Yum 26%, Ok 26%, Yuck 48%
- Wissahickon Fernhill: Yum 12%, Ok 27%, Yuck 61%
- Wissahickon Awbury: Yum 22%, Ok 23%, Yuck 55%
Asking for Fruit and Vegetable at Home

Students’ reporting of whether they would request the fruits and vegetables at home were similar to students’ opinions of the fruits and vegetables. The majority of students reported that they would ask for the fruits at home, while about 30% said they would request the vegetables at home. Again, ICS West students were the most positive in this arena.

Figure 8. Percent of Students Asking for the Fruit and Vegetable at Home

<table>
<thead>
<tr>
<th>School</th>
<th>Fruit</th>
<th>Vegetable</th>
</tr>
</thead>
<tbody>
<tr>
<td>St. James</td>
<td>65%</td>
<td>22%</td>
</tr>
<tr>
<td>ICS West</td>
<td>81%</td>
<td>37%</td>
</tr>
<tr>
<td>Wissahickon Fernhill</td>
<td>59%</td>
<td>25%</td>
</tr>
<tr>
<td>Wissahickon Awbury</td>
<td>69%</td>
<td>30%</td>
</tr>
</tbody>
</table>
CONSUMPTION OF FRUITS & VEGETABLES

In order to assess how much fruits and vegetables students consumed during the lunch period, students completed a self-report survey on their meal consumption. These assessments were designed to answer the following primary research questions:

- What portion of a serving of fruits and vegetables did the students consume?
- How did Eatiquette consumption compare to consumption in a standard school lunch?
- How did Eatiquette consumption compare to other interventions?

CONSUMPTION

Fruit
57% of a serving

Vegetables
26% of a serving
Consumption of Fruits and Vegetables at Lunch

A primary goal of Eatiquette 360 is nurturing students with fresh, real foods. In order to assess how much fruits and vegetables students consumed during the lunch period, students completed a self-report survey on their meal consumption as described previously. Students in select grades completed these surveys immediately following the lunch period during the spring term (April-June), with the bulk of assessments occurring in May. Table 3 shows the number of meal assessments and the types of fruits and vegetables served on the days when students completed these forms. Students reported only on the primary fruit and vegetable served that day in order to make the assessment easier to complete accurately and to minimize data collection burden. However, often times an additional vegetable was served as a side dish or part of an entrée. Although this limits the ability to assess the full amount of fruit and vegetable consumed, the evaluation focused on proportion of a serving to allow for stronger comparisons to benchmarks and studies of other interventions.

Table 3. Meal Assessments at Each School

<table>
<thead>
<tr>
<th>School</th>
<th># Meal Assessments</th>
<th>Fruit Served (# times)</th>
<th>Vegetable Served (# times)*</th>
</tr>
</thead>
<tbody>
<tr>
<td>ICS West</td>
<td>6</td>
<td>Whole Fruit choice of: apple, banana, pear, or orange</td>
<td>collard greens, Asian slaw, glazed carrots, three bean salad, Italian stewed tomatoes, Mexican roasted potatoes</td>
</tr>
<tr>
<td>St. James School</td>
<td>7</td>
<td>apples (2), apples and pears in cinnamon, cantaloupe (2), oranges (3)</td>
<td>kale Caesar salad, romaine salad, Asian slaw, cilantro slaw, roasted green beans (2), southwest corn, carrot and romaine salad</td>
</tr>
<tr>
<td>Wissahickon Awbury</td>
<td>6</td>
<td>bananas (2), apples, blueberries or pears, pears, oranges</td>
<td>Mexican roasted potatoes, carrot and romaine salad, cucumber crudité, romaine, green beans, roasted broccoli</td>
</tr>
<tr>
<td>Wissahickon Fernhill</td>
<td>8</td>
<td>Berries, chocolate banana frozen yogurt, apple blueberry medley, mixed berries, bananas, apples, blueberries or pears, pears</td>
<td>romaine (2), cilantro slaw, roasted green beans, carrot crudité, Mexican roasted potatoes, carrot and romaine salad, cucumber crudité</td>
</tr>
</tbody>
</table>

*Menu items listed in the table are the primary vegetable served during each assessed meal. Other vegetable side dishes and vegetables in entrées may have also been served. At St. James, other vegetables were served on 7 days; at Wissahickon Awbury, other vegetables were served on 6 days; and at Wissahickon Fernhill, other vegetables were served on 8 days.

Students who completed at least 2 meal assessments, and who also completed the FVNI, were included in this set of analyses (n=331; excluded 22%). Each student’s meal assessments were linked in order to calculate an average fruit and vegetable consumption amount based on multiple measurements. This was done to get a more accurate assessment of typical consumption, due to the variability in children’s consumption. Students indicated how much of the fruit and vegetable they ate: none, a try (or taste), some, most or all, which translated into 0%, 10%, 33%, 66%, and 100%, respectively.

Overall Fruit and Vegetable Consumption

Students consumed, on average, 26% of their vegetable servings and 57% of their fruit servings. Consumption varied by school. Students at ICS West consumed the highest proportion of fruits and vegetables and exceeded the overall average. Wissahickon Fernhill students consumed the lowest proportions (Figures 9 and 10).

Figure 9. Percent of Vegetable Serving Consumed, by School

- Overall: 26%
- ICS West: 32%
- St. James Academy: 27%
- Wissahickon - Awbury: 23%
- Wissahickon - Fernhill: 21%

Figure 10. Percent of Fruit Serving Consumed, by School

- Overall: 57%
- ICS West: 67%
- St. James Academy: 57%
- Wissahickon - Awbury: 60%
- Wissahickon - Fernhill: 47%
Fruit and Vegetable Consumption by Gender

Male and female students consumed a similar percentage of their fruit and vegetable servings and did not differ from the overall averages (Figures 11 and 12).

*Because gender was missing for some students, analyses were run using a smaller sample size (n=281) than the “overall” analyses, resulting in a small variation.

Fruit and Vegetable Consumption by Grade

Second graders consumed the highest proportion of their vegetable servings— one-third of a serving on average, while older students consumed the lowest. For fruit, lower and middle elementary age students consumed two-thirds of their fruit servings, which was much higher than the middle school students (Figures 13 and 14).
Fruit and Vegetable Consumption by Neophobia Level

The most adventurous eaters consumed the highest proportion of their fruit and vegetable servings, exceeding the overall percentages (Figures 15 and 16). Neophobia has more of an effect on vegetable consumption as compared to fruit consumption, with adventurous eaters consuming 45% of their vegetable, while picky eaters ate 16%. Adventurous eaters ate more of their fruits and vegetables than any other sub-group.

To understand whether neophobia scores or grade had more of a robust effect on consumption, consumption as a function of both neophobia level and grade was assessed. For vegetables, while both grade and neophobia were associated with consumption, neophobia had a stronger relationship to vegetable consumption. For fruit, age had a stronger association with consumption than neophobia, with all elementary students consuming more of their fruits than middle schoolers.  

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2 When controlling for neophobia, there was a statistically significant relationship between vegetable and fruit consumption and grade at the p<0.05 level, and when controlling for age, there was a statistically significant relationship between neophobia and vegetable consumption at the p<0.0001 level.
Comparison to Benchmarks from the Literature

Standard School Lunch Benchmark
In the absence of baseline measurements for fruit and vegetable consumption prior to the implementation of Eatiquette 360, a literature review was conducted to identify comparable studies assessing student fruit and vegetable consumption during the lunch period. A total of 22 methodologically sound studies were reviewed, all of which studied consumption during the standard, cafeteria-style National School Lunch Program (NSLP) lunch or during investigator-led school lunch interventions (e.g. chef-based programs, vegetable first initiatives, etc.). The studies were reviewed with regards to sample size, year of data collection, student demographics, methodology, and other characteristics summarized in Appendix A.

In order to create a “benchmark” against which to compare outcomes from the Eatiquette program, the evaluation team applied the following criteria: (1) minimum sample size of 200 students and (2) minimum of 50% eligibility for free or reduced price lunch. Additionally, studies that were conducted after changes to the NSLP requirements in 2012 were prioritized, as were studies that had similar student populations to Eatiquette students. Ultimately, six studies were selected for the benchmarks, which measured fruit and vegetable selection and consumption during a typical NSLP school lunch. Two of the studies included were conducted prior to the NSLP changes, but were nonetheless selected due to comparability of design and clear description of offer versus serve modality (see Appendix B).

From these six studies, evaluation staff calculated a benchmark for fruit and vegetable consumption among all students eating school lunch, combining the percentage of those who did not select the fruit or vegetable with the percentage consumed among those who did select the item. Baseline values were used, as opposed to post-intervention values. The benchmarks presented below represent the average percent of a serving consumed, among all students:

- **Fruit Benchmark**: 43% of a serving
- **Vegetable Benchmark**: 29% of a serving

Overall, Eatiquette students consumed 57% of their fruit servings, a higher percentage than the fruit benchmark of 43%. Eatiquette students consumed 26% of their vegetable servings, which was slightly lower than the benchmark of 29%.

For fruit, approximately 68% of the Eatiquette students met or exceeded the benchmark, meaning they consumed the same or more than the average student at a regular school lunch. There were no differences based on gender. While there were slight differences in meeting the fruit benchmark according to neophobia scores, these differences were not statistically significant. Students are more accepting of fruits in general, and thus neophobia had less of an association with fruit consumption. However, there were significant differences by grade category, with about 75% of elementary students at or above the benchmark, compared to 51% of 6-8th graders, as indicated in Figure 17 on the following page.
For vegetables, approximately 39% of Eatiquette students met or exceeded the benchmark, meaning they consumed more than the average student at regular school lunch. Again, there were no differences based on gender. However, there were significant differences based on grade category and neophobia score, with much larger percentages of younger students (2nd grade, 48%) and adventurous eaters (69%) meeting or exceeding the benchmark for vegetables compared to their counterparts (Figure 18).

**Figure 17. Percentage of Eatiquette students meeting the benchmark for fruit consumption (n=332).**

<table>
<thead>
<tr>
<th></th>
<th>Did not meet benchmark</th>
<th>Meet / Exceed benchmark</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall</td>
<td>32%</td>
<td>68%</td>
</tr>
<tr>
<td>Male</td>
<td>31%</td>
<td>70%</td>
</tr>
<tr>
<td>Female</td>
<td>30%</td>
<td>70%</td>
</tr>
<tr>
<td>Lower Elem**</td>
<td>27%</td>
<td>73%</td>
</tr>
<tr>
<td>Middle Elem**</td>
<td>24%</td>
<td>76%</td>
</tr>
<tr>
<td>Middle School**</td>
<td>49%</td>
<td>51%</td>
</tr>
<tr>
<td>Adventurous Eater</td>
<td>26%</td>
<td>74%</td>
</tr>
<tr>
<td>Average Eater</td>
<td>36%</td>
<td>64%</td>
</tr>
<tr>
<td>Picky Eater</td>
<td>27%</td>
<td>73%</td>
</tr>
</tbody>
</table>

**Figure 18. Percentage of Eatiquette students meeting the benchmark for vegetable consumption (n=331).**

<table>
<thead>
<tr>
<th></th>
<th>Do not meet benchmark</th>
<th>Meet / Exceed benchmark</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall</td>
<td>61%</td>
<td>39%</td>
</tr>
<tr>
<td>Male</td>
<td>62%</td>
<td>38%</td>
</tr>
<tr>
<td>Female</td>
<td>60%</td>
<td>40%</td>
</tr>
<tr>
<td>Lower Elem*</td>
<td>52%</td>
<td>48%</td>
</tr>
<tr>
<td>Middle Elem*</td>
<td>67%</td>
<td>33%</td>
</tr>
<tr>
<td>Middle School*</td>
<td>69%</td>
<td>31%</td>
</tr>
<tr>
<td>Adventurous Eater**</td>
<td>31%</td>
<td>69%</td>
</tr>
<tr>
<td>Average Eater**</td>
<td>63%</td>
<td>37%</td>
</tr>
<tr>
<td>Picky Eater**</td>
<td>74%</td>
<td>26%</td>
</tr>
</tbody>
</table>

*p<0.01, **p<0.001
School Lunch Intervention Studies

Figures 17 and 18 provide context about how consumption compares between students participating in the Eatiquette school lunch to students consuming a typical school lunch. The original 22 articles reviewed also provide context to the broad scope of findings regarding the impact of school lunch interventions. Figures 19 and 20 below show how results from this Eatiquette evaluation compare to results from other interventions. They also underscore the vast variability in the field, depending on intervention type, student demographics and location, and methodology. There is an important distinction between the other intervention studies and the Eatiquette school lunch. The intervention studies calculate consumption among only the students who selected the fruit or vegetable during the meal. They do not include the students who never put the item on their trays to begin with. In contrast, in the pre-plated Eatiquette model, all food items are placed on the students’ plates, removing the factor of choice. Therefore, all students—even those who may not have wanted the item and who would never consume it—were included in this analysis.

In Figures 19 and 20, there are two Eatiquette values for overall fruit consumption and two for overall vegetable consumption presented. The first is the average percent consumed including all students who ate school lunch (“Vetri” in the figures). The second is the average consumed excluding students who reported not consuming any of the food (“Vetri*” in the figures). This second set of values was calculated in order to align with the intervention studies that exclude those who do not select the fruit or vegetable. Here, it is assumed that Eatiquette students who reported eating none of their vegetables and none of their fruit would have never selected those items to begin with and were therefore excluded from this calculation.

Compared to studies of other policy and program interventions, the average fruit serving consumed among Eatiquette students was higher than about one-half of these other programs. The average vegetable serving consumed among Eatiquette students was lower than most of these other programs. However, when the Eatiquette students who reported eating none of their fruit or vegetable were excluded (Vetri*), then the average amount of fruit and vegetable servings consumed among Eatiquette students exceeds the majority of other intervention studies. This is a very positive finding and allows for a different way of comparing Eatiquette outcomes to these intervention studies. It cannot actually be assumed that all of those students who ate no vegetables and no fruits would have never selected the item initially. In addition, having all students take each meal component is part of the Eatiquette model. Given the methodological discrepancies limiting an “apples to apples” comparison, having these two sets of Eatiquette values provides a thorough way of comparing Vetri outcomes to those in other intervention studies.
Figure 19. Average fruit consumption (%) at school lunch in 22 published studies compared with Eatiquette consumption.

Note: Vetri* value does not include students who responded that they ate none of their fruit.

Figure 20. Average vegetable consumption (%) at school lunch in 22 published studies compared with Eatiquette consumption.

Note: Vetri* value does not include students who responded that they ate none of their vegetables.
Kitchen staff at each of the four schools received a short, paper survey at the end of the school year. Kitchen staff were informed that the survey was anonymous, that their answers have no impact on their job nor on whether their school continues the Vetri program. The survey assessed:

- Their beliefs about fresh and whole ingredients in school lunches and their ability to prepare the Vetri school meals
- Their job satisfaction

**ABOUT THE KITCHEN STAFF PARTICIPANTS**

8 total participants

- 3 from ICS West
- 3 from St. James
- 1 from Wissahickon Charter Awbury
- 1 from Wissahickon Charter Fernhill

7 out of 8 have worked in a school kitchen before

- 1-3 years = 4 kitchen staff
- 10+ years = 2 kitchen staff
Beliefs about school lunches

All participants said they think it is important to use fresh and whole ingredients for school lunches, that they understand why these ingredients are healthy, and that they are confident that they can prepare a Vetri school meal. Four out of 8 participants think that regular school lunches are unhealthy.

Job Satisfaction

Five out of 8 respondents strongly agreed that Vetri gave them the right amount of training to prepare Vetri lunches and that their actual work matches their job description. Six indicated that they would like to prepare Vetri lunches again and that they enjoyed preparing the Vetri lunches. One-half of respondents said that they gained skills that would make them a stronger cook.

When asked what they liked most about the Vetri program, kitchen staff said that they appreciate that the students are eating fresh, nutritious and new foods. One staff person said that “children are more enthusiastic and willing to work together,” and another added that “kids and adults alike are eating heatherier and smarter.” Kitchen staff also described aspects of the Vetri program they disliked, including: the amount of preparation; repetition of meals and recipes; misalignment with students’ preferences; and not all of the ingredients being available from their suppliers. To improve the program, kitchen staff suggested less beans, more kid-friendly items, and to ease the children into trying new foods rather than exposing them to many new foods at once.
Teachers and administrative staff at each of the four schools were asked to complete a brief feedback survey at the end of the school year. Teachers and other staff received an email with a web link to complete the survey and lunch aides received a paper copy. All staff were informed that the survey was anonymous and only evaluation staff would have access to their responses. They were also informed that their answers would have no impact on their job or whether their school continued the Vetri program.

Building off of results from the 2015–2016 Eatiquette evaluation, the survey focused on the following main topic areas:

- Student behavior following the lunch period
- Student behavior during the lunch period
- Student attendance at lunch
- Student attitudes about being Table Captain
- Student relationships with teachers and fellow students

**ABOUT THE STAFF PARTICIPANTS**

**School Representation**
- 2 from ICS West
- 6 from St. James
- 17 from Wissahickon Charter Awbury
- 2 from Wissahickon Charter Fernhill

**Staff Role**
- 10 Teachers
- 5 Administrators
- 2 Teaching Assistants
- 4 Lunch Aides
- 6 Other Staff

**Average time working at the school**
- 5 yrs (range: from 0-16 yrs)
**Student Behavior During the Lunch Period**

Survey participants were asked to rate several categories of student behavior during the lunch period. Plate waste was the only category in which staff indicated more problematic behavior; half (50%) of staff respondents reported more plate waste after implementation of Eatiquette. However, for half of the behavior categories, staff most often reported less problematic behavior. Notably, 67% observed a reduction in bullying and 60% observed a reduction in fighting or aggressive student behavior. For the remaining categories (adult yelling, down time, and adult disciplining), staff most frequently did not notice any change after implementation of Eatiquette (Figure 25).

![Student Behavior During Lunch after Eatiquette was Implemented](image)

**Student Behavior Following the Lunch Period**

Survey participants were also asked to rate several categories of student behavior in the classroom following the lunch period. Respondents most commonly reported that behavior was the same, indicating that the Eatiquette program did not positively or negatively impact student behavior in the classroom following lunch. In all categories except for hunger, more participants responded that behavior was better after implementation of Eatiquette than those who reported that behavior was worse (Figure 26). Further investigation of potential relationships between increased plate waste and student hunger following the lunch period is recommended. Since the majority of staff responses came from one school, and the sample size at the remaining three schools was limited, individual follow-up with school administrators may help clarify whether this is an isolated concern.
Being Table Captain is a good leadership opportunity

Students are proud to be Table Captain

Student Attendance at Lunch

The majority of staff participants (65%) indicated that attendance at lunch did not change after Eatiquette was implemented (Figure 27).

Student Attitudes about being Table Captain

While nearly all staff surveyed agreed or strongly agreed that being Table Captain is a good leadership opportunity (96%), fewer agreed or strongly agreed that students are proud to be a Table Captain (64%) (Figure 28).
Student Relationships with Teachers and Fellow Students

Staff members were asked a series of questions about student-teacher relationships and peer relationships. Respondents felt most positively about the role of lunch in building stronger student-teacher relationships, creating empathy for students among teachers, and building new peer relationships. Almost all respondents (83%) agreed or strongly agreed that students and teachers who eat together build stronger relationships. No respondents disagreed or strongly disagreed (Figure 29).

Figure 29. Staff Perceptions About the Impact of Shared Lunch on Relationships

<table>
<thead>
<tr>
<th>Statement</th>
<th>Strongly Agree/Agree</th>
<th>Neutral</th>
<th>Disagree/Strongly Disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>Students and teachers who eat together build stronger relationships</td>
<td>83%</td>
<td>0%</td>
<td></td>
</tr>
<tr>
<td>Teachers who eat with their students have more empathy for students</td>
<td>72%</td>
<td>6%</td>
<td></td>
</tr>
<tr>
<td>Students build relationships with new peers when assigned seats during lunch</td>
<td>60%</td>
<td>4%</td>
<td></td>
</tr>
<tr>
<td>Teachers who eat with their students during lunch are treated with more respect in the classroom</td>
<td>39%</td>
<td>17%</td>
<td></td>
</tr>
<tr>
<td>Students can effectively resolve classrooms conflicts at lunch</td>
<td>29%</td>
<td>25%</td>
<td></td>
</tr>
</tbody>
</table>

Open-Ended Responses

How do you think the Vetri program helps your students?

The majority of respondents provided positive feedback when asked about the impact of Eatiquette on students: 14 of the 20 responses were positive and four were neutral. Exposing students to new foods and offering a nutritious meal were mentioned most often, while several staff specifically mentioned benefits of the cooking class and positive relationship building between students. Examples of positive feedback include:

“Our students are truly full of nutritious food. They have a chance to relax and talk with friends. They are open to trying more different types of food.”

“Good food equals good behavior! Real food makes a real difference.”

“Exposing them to new foods, especially during the cooking classes; making the meal a social activity; encouraging them to talk with new kids.”

“I feel that it’s giving them more energy. The balance given helps them throughout their day.”

Several participants had negative or constructive comments regarding the program:

“It doesn’t because the students complain about how nasty the food is. They are tired of eating the same thing every week. Most of the students throw the food away.”
How do you think the Vetri program could be improved? 
Staff provided a wide variety of feedback about how the Vetri program could be improved. However, there was a general sentiment that a wider variety of foods should be served, including fruits and vegetables, familiar or “child friendly” foods, and the occasional “junk” food (e.g. French fries). Respondents also mentioned the need for larger portion sizes and several mentioned that students are not eating the foods served. Examples of suggestions include:

“We have noticed that there has been an increase in students not eating the lunch so changing the menu to make healthy meals that are more appealing to young kids would be helpful.”

“More child friendly meals just prepared in a healthy way.”

“... Also, a partnership between teachers, lunchroom staff, and the chefs could go a long way towards getting the kids to try more foods. When we have a new snack in my room, most of my kids try it. But it feels like it’s accepted in the lunchroom that the kids just aren’t going to try it and much of it gets wasted.”

Are there any potential negative impacts? If so, please explain. 
Among the 15 staff that provided a response to this question, five said there were none or they could not think of any. Another six staff specifically mentioned students not eating or eating less because they did not like the food. Respondents noted:

“The negative attitude about the food is turning onto the staff, creating a lot of negative relationships between cafeteria staff and students.”

“The kids are eating a lot less at lunch, sometimes just pushing their plate away immediately. It’s become accepted by the lunchroom staff that the kids don’t like the food, so they don’t encourage them to eat and in fact clear the table away before lunch ends.”

Any other comments about the Vetri lunch program? 
When asked to provide additional feedback or comments, responses echoed information provided earlier: staff think that serving healthier foods is a good thing, but there needs to be more variety, more kid-friendly and familiar foods, and larger servings. As several participants aptly stated:

“Our kids like new foods and healthy foods. But the food can’t be new and different all the time.”

“I believe that a program like this needs to run a minimum of two years to see the full potential. The first year some students will fight the change, but eventually they will come around.”
Eatiquette in the Classroom

Teachers, teaching assistants, and some administrators completing the survey were also asked a series of questions about Eatiquette in the Classroom, the nutrition and cooking education component of the school lunch program. Of the 18 staff who completed this iteration of the survey, only five had participated in or observed Eatiquette in the Classroom. When asked about the level of impact on students’ food choices outside of the classroom, eight provided a response and 10 indicated they were not sure. Staff were split between believing that the program had a great deal or moderate impact on students’ outside food choices and believing that the program had little to no effect.

Figure 30. Staff Beliefs About Eatiquette’s Impact on Students’ Outside Food Choices

Although staff respondents were unsure of the impact the program might have had on students’ food choices outside of the classroom, many had additional positive feedback about Eatiquette in the Classroom. Among those who provided additional feedback (n=5), all mentioned that the students enjoyed the program. Examples of feedback include:

“The kids were so excited to go to these classes! I think it was awesome they had that opportunity.”

“Students enjoy the cooking classes. It makes them retain nutritional information [and] eat what they’re learning about.”
CONCLUSIONS

FRUIT & VEGETABLE CONSUMPTION & ATTITUDES

This evaluation of Eatiquette 360 revealed several key findings related to fruit and vegetable consumption that are largely consistent with the published literature on school lunches:

• Students consumed more fruit than vegetables overall.
• Younger students were less neophobic and tended to eat more of both fruits and vegetables.
• There was no difference in consumption by gender.
• Consumption differed by school, with students at ICS West eating the highest proportions of fruits and vegetables. This finding may be due to the comparatively younger age of ICS West students in the study who were 2nd and 4th graders.
• Students did not like the taste of vegetables served. For over half of the meal assessments, students rated the vegetables as “yuck” and this was fairly consistent across schools.
• Students liked the taste of the fruit served. For well over half of the meal assessments, students rated the fruit as “yum,” including 80% of ICS West students and 65% of Wissahickon Awbury students.
Fidelity to the Eatiquette Lunch Model

St. James School consistently executed the main pillars of the Eatiquette program, including having a staff person and table captain present at the lunch tables. These program components may explain that, while St. James is a middle school with older students, average consumption among these students was second only to ICS West for vegetable consumption. Additionally, because St. James has been executing this program for several years, while the other schools were in their first year of the program, its students may be more accepting and familiar with both the Eatiquette style and flavors. The other three schools, on average, included a table captain during 75% of the meal assessments; an adult during one-third; and both a table captain and an adult during one-quarter of meal assessments. These elements of program fidelity are important because they are related to students' willingness to try the fruits and vegetables on their plate.

Comparison of Eatiquette to Benchmarks and other Interventions

In the context of the literature review, it is important to note how much variation there is in the proportion of fruits and vegetables students consume during lunch. In some ways, it is hard to compare studies to each other, given the variability in intervention design, method of consumption measurement, and student demographic profile. However, several important findings can be drawn, particularly when keeping these differences in mind.

- **Eatiquette students consumed a higher proportion of their fruit servings, but a slightly lower proportion of their vegetable servings** compared to the benchmark for fruit and vegetable consumption during standard school lunches.
- **Student fruit consumption during Eatiquette lunches was higher than consumption reported in about half of the other policy and program interventions.** The average vegetable serving consumed among Eatiquette students was lower than most of these other programs.
- **When the Eatiquette students who reported eating none of their fruit or vegetable are excluded from analysis (assuming that these students would have never selected it in the first place), then the average amount of fruit and vegetable servings consumed among Eatiquette students exceeds the majority of other intervention studies.**

Recommendations

- **Start Young**

  Younger students had higher consumption values and were also more adventurous eaters. The Eatiquette 360 program, and its companion -- Eatiquette in the Classroom, should be implemented with students as early as possible to capitalize on their positive attitudes towards fresh foods.

- **Focus on Attitudes towards Fruits and Vegetables**

  Students with higher levels of neophobia consumed lower proportions of their fruit and vegetable servings. This finding was more extreme for vegetable consumption. Focusing on increasing acceptance of and trying new foods may promote vegetable consumption. Staff survey feedback
indicated that Eatiquette in the Classroom was well-received by students, and Vetri staff indicated that students were highly likely to try the items prepared in class. Therefore, bolstering this aspect of the program is recommended.

- **Increase Palatability of Vegetables and Menu Variety**

  Given the low consumption of vegetables, increasing their palatability and familiarity may increase consumption. Additionally, school staff indicated that students would like to see increased variety in menu offerings, which may also promote consumption.

- **Promote Staff Participation in Eatiquette 360**

  There was a strong association between students trying vegetables and staff sitting with students at the lunch table. However, with the exception of St. James, staff participation was low and inconsistent. Engaging staff is challenging because the lunch period occurs during their personal time. Talking with staff and administrators about strategies to boost adult engagement is recommended as staff presence at the table could increase students’ willingness to try vegetables and ultimately consumption, as well as promote positive relationships between students and staff.

- **Assess Staff Concerns about Increased Plate Waste**

  In the staff survey, some expressed concern that students were eating less and wasting more during Eatiquette lunches. However, two-thirds of staff survey participants were from Wissahickon Awbury, so it would be helpful to speak with the staff at the other schools to determine whether this is a consistent concern. When the NSLP changes went into effect in 2012, increasing serving sizes and requiring students to select a fruit or vegetable, there was a similar widespread concern. Several studies investigated whether there was additional plate waste under the new guidelines, only to find that the concerns were not validated. School staff concerns could be more of a function of attitudes toward change than true challenges; a larger assessment of staff perceptions would shed light on this issue.

**Limitations and Strengths**

There are several limitations to this evaluation. First, in lieu of baseline data collected from students in this study, baseline values were derived from studies in the published research literature. It is impossible to conclude how much students changed over time as a function of the Eatiquette program. Rather conclusions can only be made by comparing Eatiquette students to other studies and to sub-groups within this study (e.g. males to females; younger students to older students).

Second, in order to conserve resources, a self-report method was used to determine fruit and vegetable consumption. This presented a few challenges. The literature suggests that children may provide socially desirable responses when self-reporting, which may have inflated true values in this study. However, recent research suggests that self-report, when using best practices, is reliable, even among young
children.\textsuperscript{1} Also, in efforts to simplify the assessment, students were asked only about the primary vegetable served, thus results do not reflect the total quantity of vegetables that may have been consumed during each lunch period. However, asking young students to determine how much of the peppers in a stir fry they consumed via self-report was deemed too difficult and would likely result in unreliable results. Extrapolation based on percent of the primary vegetable consumed is possible, but percent consumption is likely to vary from one menu item to another. Future iterations of this evaluation could try to include the other vegetables offered in addition to the main vegetable.

This evaluation, like the majority of studies included in the literature review, reported on the proportion of the serving consumed and not on the absolute amount consumed. For Eatiquette, expected serving sizes were known, but there was no way to verify that the expected amount was the actual amount served. Determining the volume of fruit and vegetable consumption, however, is also an important outcome and could be a point of consideration for future evaluations.

There are several strengths to this evaluation as well, which differentiate it from other studies in the literature. Neophobia scores were used to moderate the relationship between students and their fruit and vegetable consumption, providing further insight into consumption and how it can be improved. Second, every student in the study had at least two measurements, which strengthens the accuracy of their consumption data. Most studies do not track students over multiple assessments, as was done in this study. Third, various aspects of the evaluation design promote sustainability and long-term data collection. The use of unique student IDs to link student data allows for students to be tracked over multiple school years and to potentially assess longer-term impacts of Eatiquette. The data collection instruments in this study were designed to be implemented at a low cost and with minimal burden, so Vetri can continue to collect data long-term.

APPENDICES

APPENDIX A: LITERATURE REVIEW SUMMARY

APPENDIX B: BENCHMARK CONSUMPTION CALCULATIONS
Appendix A: Literature Review Summary

Brief Description of Methods

In the absence of baseline measurements for fruit and vegetable consumption prior to the implementation of Eatiquette 360, a literature review was conducted to identify comparable studies assessing student fruit and vegetable consumption during the lunch period. A total of 22 methodologically sound studies were reviewed, all of which studied consumption during the standard, cafeteria-style National School Lunch Program (NSLP) lunch or during investigator-led school lunch interventions (e.g. chef-based programs, vegetable first initiatives, etc.). The studies were reviewed with regards to sample size, year of data collection, student demographics, and other characteristics summarized in the table below. The fruit and vegetable consumption values in the table represent consumption following some form of school lunch intervention. The researchers conducting these studies also collected data on consumption during the typical school lunch as a comparison. Typical school lunch consumption values from a select number of these studies are presented in Appendix B.

The 22 articles reviewed and summarized in this Appendix (A), provide context to the broad scope of findings regarding the impact of school lunch interventions. This context allows for comparison between the Eatiquette evaluation results and other school lunch interventions that aim to improve upon the standard school lunch. These studies also underscore the vast variability in the field, depending on intervention type, student demographics and location, and methodology. There is an important distinction between the other intervention studies and the Eatiquette school lunch. The intervention studies calculate consumption among only the students who selected the fruit or vegetable during the meal. They do not include the students who never put the item on their trays to begin with. In contrast, in the pre-plated Eatiquette model, all food items are placed on the students’ plates, removing the factor of choice. The table on the following pages provides a brief summary of the articles reviewed and intervention outcomes.
**Literature Review Summary Table:** School Lunch Intervention Studies Assessing Fruit and Vegetable Consumption

<table>
<thead>
<tr>
<th>Study #</th>
<th>Citation</th>
<th>Study Description</th>
<th>Sample</th>
<th>Year(s) of Data Collection</th>
<th>% Fruit Consumed (Intervention)</th>
<th>% Veg Consumed (Intervention)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Newman C. (2013). Fruit and Vegetable Consumption by School Lunch Participants: Implications for the Success of New Nutrition Standards. <em>U.S. Department of Agriculture, Economic Research Service</em>, ERR-154.</td>
<td>This report examines whether students who attended schools serving more fruits and vegetables, in amounts that would meet the new NSLP standards, actually ate more fruits and vegetables than students at schools that did not.</td>
<td>Nationally representative sample of 1442 participants from 257 schools</td>
<td>2005</td>
<td>52%</td>
<td>49%</td>
</tr>
<tr>
<td>2</td>
<td>Chinchanchokchai S. &amp; Jamelske E.M. (2015). Successes and Challenges in Using Group Level Incentives to Increase Children's Aggregate Fruit and Vegetable Consumption for Lunch in One Wisconsin Elementary School. <em>School Nutrition Association</em>, 39(2).</td>
<td>Existing research has investigated the effects of using individual incentives and positive reinforcements to influence children to eat more fruits and vegetables for lunch and snack during school. This study explored using group-level incentives to motivate children in a Wisconsin elementary school to eat more fruits and vegetables.</td>
<td>424 pre-K to 5th grade students in one Wisconsin elementary school; 85.4% white and 51.7% male</td>
<td>Not specified</td>
<td>88%</td>
<td>42%</td>
</tr>
<tr>
<td>3</td>
<td>Cohen J.F.W., et al. (2012). Long-term impact of a chef on school lunch consumption: findings from a 2-year pilot study in Boston middle schools. <em>J Acad Nutr Diet</em>, 112(9), 927-933. doi:10.1016/j.jand.2012.01.015.</td>
<td>This study assessed the impact of a chef training program on whole grain, vegetable, and fruit consumption among students at urban, low-income Boston middle schools</td>
<td>Urban, low income middle school students in intervention group (n=1,609) and control group (1,440)</td>
<td>2007-2009</td>
<td>47%</td>
<td>54%</td>
</tr>
<tr>
<td>4</td>
<td>Cohen J.F.W., et al. (2013). School Lunch Waste Among Middle School Students. <em>Am J Prev Med</em>, 44(2), 114–121. <a href="http://dx.doi.org/10.1016/j.amepre.2012.09.060">http://dx.doi.org/10.1016/j.amepre.2012.09.060</a>.</td>
<td>This study measured the costs associated with plate waste at two intervention schools and two control schools in Boston. The intervention schools received the Chef Initiative, in which a professional chef trained cafeteria staff to make healthier meals.</td>
<td>Boston middle school students in control schools (n=1440) and intervention schools (n=1609)</td>
<td>2007-2009</td>
<td>45%</td>
<td>40%</td>
</tr>
<tr>
<td>5</td>
<td>Cohen J.F.W., et al. (2014). Impact of the New U.S. Department of Agriculture School Meal Standards on Food Selection, Consumption, and Waste. <em>Am J Prev Med</em>, 46(4), 388–394. <a href="http://dx.doi.org/10.1016/j.amepre.2013.11.013">http://dx.doi.org/10.1016/j.amepre.2013.11.013</a>.</td>
<td>Researchers used changes to the USDA nutritional standards to assess changes in selection and consumption of school meals before (fall 2011) and after implementation (fall 2012). In this study, changes to the nutritional standards served as the intervention.</td>
<td>Four elementary and middle schools in an urban, low-income school district; 1030 students total</td>
<td>2012-2013</td>
<td>55%</td>
<td>41%</td>
</tr>
<tr>
<td>Study #</td>
<td>Citation</td>
<td>Study Description</td>
<td>Sample</td>
<td>Year(s) of Data Collection</td>
<td>% Fruit Consumed (Intervention)</td>
<td>% Veg Consumed (Intervention)</td>
</tr>
<tr>
<td>--------</td>
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<td>--------</td>
<td>---------------------------</td>
<td>---------------------------------</td>
<td>-------------------------------</td>
</tr>
<tr>
<td>7</td>
<td>Cullen K.W. and Zakeri I. (2004). Fruits Vegetables, Milk, and Sweetened Beverages Consumption and Access to a la Carte/Snack Bar Meals At School. <em>American Journal of Public Health, 94</em>(3), 463-467.</td>
<td>This study assessed the impact of access to school snack bars on students’ fruit, vegetable, milk, and sweetened beverage consumption.</td>
<td>594 4th and 5th grade students from a school district in SE Texas (24% eligible for free or reduced price lunch)</td>
<td>1998-1999 and 1999-2000</td>
<td>12%</td>
<td>15%</td>
</tr>
<tr>
<td>8</td>
<td>Cullen K.W., et al. (2015). Changes in Foods Selected and Consumed After Implementation of the New National School Lunch Program Meal Patterns in Southeast Texas. <em>Preventative Medicine Reports, 2</em>, 440-443. <a href="http://dx.doi.org/10.1016/j.pmedr.2015.05.007">http://dx.doi.org/10.1016/j.pmedr.2015.05.007</a>.</td>
<td>Researchers investigated the change in food selected and consumed by students in SE Texas after implementation of the New National School Lunch Program.</td>
<td>472 students (2011) and 573 (2013) from eight elementary schools in one SE Texas school district; four low and four middle income schools (49-79% and 7-18% free/reduce price lunch eligibility)</td>
<td>2011/2013</td>
<td>69%</td>
<td>68%</td>
</tr>
<tr>
<td>9</td>
<td>Elsbernd, S.L., et al. (2016). Serving Vegetables First: A strategy to increase vegetable consumption in elementary school cafeterias. <em>Appetite 96</em>, 111-115. <a href="http://dx.doi.org/10.1016/j.appet.2015.09.001">http://dx.doi.org/10.1016/j.appet.2015.09.001</a>.</td>
<td>Served vegetables first in order to increase vegetable consumption in elementary school cafeterias</td>
<td>575 K-5 students from one urban elementary school in Minnesota; 63% free/reduced price lunch; 30% white and 70% racial/ethnic minority</td>
<td>Not available</td>
<td>Not applicable</td>
<td>11%</td>
</tr>
<tr>
<td>10</td>
<td>Graziose, M.M. (2017). A Conceptual Evaluation Framework for Measuring Fruit and Vegetable Consumption at School Lunch among Elementary Students Participating in the National School Lunch Program. (Doctoral Dissertation).</td>
<td>All school participated in FoodCorps. National service organization that puts service members in schools to do farm-to-school activities, like nut. Ed., and experiential learning to increase f/v consumption.</td>
<td>2571 meals from 2nd and 3rd graders across 20 elementary schools similar in demographics to those receiving Title I funding (65% free/reduced price lunch)</td>
<td>2015-2016</td>
<td>57%</td>
<td>38%</td>
</tr>
<tr>
<td>11</td>
<td>Hakim, S.M. &amp; Meissen, G. Increasing Consumption of Fruits and Vegetables in the School Cafeteria:</td>
<td>This study evaluated a setting-level intervention designed to increase consumption of fruits and vegetables</td>
<td>2,064 observations from one K-8 public school in a mid-sized Midwestern city; 75%</td>
<td>2011-2012</td>
<td>67%</td>
<td>42%</td>
</tr>
<tr>
<td>Study #</td>
<td>Citation</td>
<td>Study Description</td>
<td>Sample</td>
<td>Year(s) of Data Collection</td>
<td>% Fruit Consumed (Intervention)</td>
<td>% Veg Consumed (Intervention)</td>
</tr>
<tr>
<td>--------</td>
<td>--------------------------------------------------------------------------</td>
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<tr>
<td>12</td>
<td>Handforth K.M., et al. (2016). Fruit and Vegetable Plate Waste Among Students in a Suburban School District Participating in the National School Lunch Program. <em>Journal of Child Nutrition and Management, 40</em>(1).</td>
<td>The purpose of this project was to assess fruit and vegetable plate waste, examine patterns of selection and consumption of specific fruit and vegetable subgroups, and analyze differences across gender, grade level, and school.</td>
<td>Hispanic; 81% free/ reduced price lunch; 693 lunch trays from two elementary, one middle, and one high school in a SE Pennsylvania suburban school district; 11% free/ reduced price lunch; 85.6% white (among residents)</td>
<td>2014</td>
<td>90%</td>
<td>40%</td>
</tr>
<tr>
<td>14</td>
<td>Ishdorj A., et al. (2016). Nutrient Density and the Cost of Vegetables from Elementary School Lunches. <em>American Society for Nutrition. Adv Nutr, 7</em>, 2545–605. doi:10.3945/an.115.008698.</td>
<td>This study assessed the nutrient content of vegetables offered through the National School Lunch Program and examined the relation between the overall nutrient density of vegetable subgroups and the costs of nutrients offered and wasted before and after the changes in school meal standards.</td>
<td>K-5 students from three elementary schools in central Texas; demographics varied by school (31-99% free/ reduced price lunch); data collected from 8,430 students (4145 before, 4285 after)</td>
<td>2012</td>
<td>N/A</td>
<td>42%</td>
</tr>
<tr>
<td>15</td>
<td>Kropp J.D., et al. (2017). A Plate Waste Evaluation of the Farm to School Program. <em>J Nutr Educ Behav, 1-9</em>. <a href="https://doi.org/10.1016/j.jneb.2017.10.005">https://doi.org/10.1016/j.jneb.2017.10.005</a>.</td>
<td>Researchers investigated the impacts of the Farm to School (FTS) program on selection and consumption of fruits and vegetables among elementary schools students.</td>
<td>11,262 meal observations from 1st-5th grade students across six (3 treatment/ 3 control) elementary schools in Florida; 31-71% free/ reduced price lunch; 20-58% white</td>
<td>2015</td>
<td>47%</td>
<td>22%</td>
</tr>
<tr>
<td>16</td>
<td>Miller G.F., et al. (2015). Increasing Portion Sizes of Fruits and Vegetable in an Elementary School Lunch Program Can Increase Fruit and Vegetable Consumption. <em>Appetite 91</em>, 426–430. <a href="http://dx.doi.org/10.1016/j.appet.2015.04.081">http://dx.doi.org/10.1016/j.appet.2015.04.081</a>.</td>
<td>The goal of this study was to determine whether increasing the portion sizes of fruits and vegetables in an elementary school cafeteria environment would increase children’s consumption of them.</td>
<td>K-5th grade students from one elementary school in Minnesota (n=643–758); 63% free/ reduced price lunch; 30% white, 70% racial/ethnic minority</td>
<td>2011</td>
<td>34%</td>
<td>40%</td>
</tr>
<tr>
<td>Study #</td>
<td>Citation</td>
<td>Study Description</td>
<td>Sample</td>
<td>Year(s) of Data Collection</td>
<td>% Fruit Consumed (Intervention)</td>
<td>% Veg Consumed (Intervention)</td>
</tr>
<tr>
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</tr>
<tr>
<td>17</td>
<td>Miller G.F., et al. The effects of pre-ordering and behavioral nudges on National School Lunch Program participants' food item selection. <em>Journal of Economic Psychology</em>, 55, 4-16.<a href="http://dx.doi.org/10/1016/j.joep.2016.02.101">http://dx.doi.org/10/1016/j.joep.2016.02.101</a>.</td>
<td>This study examined the effects of pre-ordering and pre-ordering with behavioral nudges on the selection of fruit, vegetables, and low-fat milk by NSLP participants.</td>
<td>169 students in 5th/6th grade (treatment) and 4th and 7th grade (control) in a Florida school; approximately 70% white; 62% free/reduced price lunch</td>
<td>2013</td>
<td>Not applicable</td>
<td>40%</td>
</tr>
<tr>
<td>18</td>
<td>Niaki S.F., et al. (2016). Younger Elementary School Students Waste More School Lunch Foods Than Older Elementary School Students. <em>Academy of Nutrition and Dietetics</em>, 117(1), 95-100. <a href="http://dx.doi.org/10.1016/j.jand.2016.08.005">http://dx.doi.org/10.1016/j.jand.2016.08.005</a>.</td>
<td>This cross-sectional study investigated whether there were differences in school lunch foods consumed and wasted by grade level of elementary school students.</td>
<td>568 meal observations from K-5 students at eight elementary schools (half low-income) in one school district in Houston, TX</td>
<td>2013</td>
<td>70%</td>
<td>74%</td>
</tr>
<tr>
<td>19</td>
<td>R&amp;E Group at PHMC. (2016). Vetri Community Partnership's Etiquette Program Formative Evaluation. Philadelphia, PA: Author.</td>
<td>This evaluation examined the effects of the Etiquette, family-style school lunch intervention on fruit and vegetable consumption among fifth grade students from two Philadelphia schools.</td>
<td>One charter (5-8) and one public (K-8) school in Philadelphia; 100% free/reduced price lunch; 865 and 827 students, respectively</td>
<td>2015-2016</td>
<td>75%</td>
<td>35%</td>
</tr>
<tr>
<td>21</td>
<td>Smith S.L., &amp; Cunningham-Sabo L. (2013). Food choice, plate waste, and nutrient intake of elementary- and middle-school students participating in the US National School Lunch Program. <em>Public Health Nutrition</em>: 17(6), 1255–1263 doi:10.1017/S1368950413001894.</td>
<td>This plate waste study of elementary and middle school students in Northern Colorado compared food consumption to new and previous school lunch standards. Plate waste was measured using a previously validated digital photography method.</td>
<td>899 lunch trays - 535 elementary (three schools) and 364 middle-school students (two schools) in northern Colorado; school district population 77% white; 35% free/reduced price lunch</td>
<td>2010</td>
<td>63%</td>
<td>66%</td>
</tr>
<tr>
<td>22</td>
<td>Zellner &amp; Cobuzzi. (2016). Just dessert: Serving fruit as a separate &quot;dessert&quot; course increases vegetable consumption in a school lunch. <em>Food Quality and Preference</em> 48, 195-198.</td>
<td>This study investigated the impact of serving the well-liked fruit course at the same time as or after the less liked vegetable in a school lunch, served family style to 3rd and 4th grade students</td>
<td>3rd and 4th grade students (22 students on day one, 25 students on day two) from a private school in Philadelphia; 100% free/reduced price lunch</td>
<td>2014/2015</td>
<td>Not applicable</td>
<td>55%</td>
</tr>
<tr>
<td>Study #</td>
<td>Citation</td>
<td>Study Description</td>
<td>Sample</td>
<td>Year(s) of Data Collection</td>
<td>% Fruit Consumed (Intervention)</td>
<td>% Veg Consumed (Intervention)</td>
</tr>
<tr>
<td>---------</td>
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<tr>
<td></td>
<td><a href="http://dx.doi.org/10.1016/j.foodqual.2015.09.013">http://dx.doi.org/10.1016/j.foodqual.2015.09.013</a></td>
<td>lunch; 100% African American</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Appendix B: Benchmark Consumption Calculations

Brief Description of Methods

In order to create a “benchmark” against which to compare outcomes from the Eatiquette program, the evaluation team conducted a thorough review of the literature to identify comparable studies assessing student fruit and vegetable consumption during the school lunch period. Appendix A provides a full summary of the 22 articles reviewed and outcomes from the school lunch interventions. In the absence of baseline measurements at the Eatiquette 360 study schools, the evaluation team used a subset of these scientific research articles that also described outcomes from the typical NSLP school lunch to create a baseline or “benchmark.” Studies were selected if they met the following criteria:

1. Studied standard NSLP school lunch, not the effects of an intervention;
2. Collected students’ selection data (i.e. percent of students selecting different food items) and consumption data (i.e. percent of selected food consumed);
3. Had a minimum sample size of 200 students;
4. Had a minimum of 50% eligibility for free or reduced price lunch; and
5. Demonstrated similar student demographic characteristics to Eatiquette 360 students.

Additionally, studies that were conducted after changes to the NSLP requirements in 2012 were prioritized. Ultimately, six studies were selected for the benchmarks and are the focus on this Appendix (B). Two of the studies included were conducted prior to the NSLP changes, but were nonetheless selected due to comparability of design and clear description of offer versus serve modality.

From these six studies, evaluation staff calculated a benchmark for fruit and vegetable consumption among all students eating school lunch, multiplying the percentage of those who did not select the fruit or vegetable by the percentage consumed among those who did select the item. The tables on the following page summarize the data used in the six benchmark studies and the process used to calculate a single benchmark value for percent of fruit and vegetables consumed, among all students. Calculating percent consumed among all students provides the most direct comparison with Eatiquette 360 data, as all students who participated in the school lunch were asked to complete the feedback form and were included in these analyses.
# Benchmark Fruit Consumption Calculations

<table>
<thead>
<tr>
<th>Study #</th>
<th>Study (Author, Pub Yr)</th>
<th>Data Collection Yr</th>
<th>Sample Size</th>
<th>Fruit Selection+</th>
<th>Fruit Consumption++</th>
<th>Calculation</th>
<th>Total Fruit Consumption (%) Among all students</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>Cohen, 2012</td>
<td>2009</td>
<td>1440</td>
<td>0.39</td>
<td>0.62</td>
<td>0.39*0.62</td>
<td>= 24%</td>
</tr>
<tr>
<td>5</td>
<td>Cohen, 2014</td>
<td>2012-2013</td>
<td>1030</td>
<td>0.76</td>
<td>0.69</td>
<td>0.76*0.69</td>
<td>= 55%</td>
</tr>
<tr>
<td>6</td>
<td>Cohen, 2016</td>
<td>2011-2012</td>
<td>1001</td>
<td>0.76</td>
<td>0.56</td>
<td>0.76*0.56</td>
<td>= 42%</td>
</tr>
<tr>
<td>8</td>
<td>Cullen, 2015</td>
<td>2013</td>
<td>573</td>
<td>0.64</td>
<td>0.64</td>
<td>0.64*0.64</td>
<td>= 41%</td>
</tr>
<tr>
<td>10</td>
<td>Graziose, 2017</td>
<td>2015-2016</td>
<td>2571</td>
<td>0.83</td>
<td>0.57</td>
<td>0.83*0.57</td>
<td>= 47%</td>
</tr>
<tr>
<td>20</td>
<td>Schwarz, 2015</td>
<td>2014</td>
<td>373</td>
<td>0.66</td>
<td>0.74</td>
<td>0.66*0.74</td>
<td>= 49%</td>
</tr>
<tr>
<td>Average</td>
<td></td>
<td></td>
<td></td>
<td>0.67</td>
<td>0.64</td>
<td>0.67*0.64</td>
<td>= 43%</td>
</tr>
</tbody>
</table>

Study # refers to the number of the study in Figures 19 and 20.

+ The fruit selection value represents the proportion of students in the study consuming school lunch who selected a fruit item.

++ The fruit consumption value represents the proportion of fruit consumed among those who selected fruit.

Note: The benchmark value in orange is an average of the six studies. It represents the average percent of fruit consumed among all students in the study eating school lunch.

# Benchmark Vegetable Consumption Calculations

<table>
<thead>
<tr>
<th>Study #</th>
<th>Study (Author, Pub Yr)</th>
<th>Data Collection Yr</th>
<th>Sample Size</th>
<th>Vegetable Selection+</th>
<th>Vegetable Consumption++</th>
<th>Calculation</th>
<th>Total Vegetable Consumption (%) Among all students</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>Cohen, 2012</td>
<td>2009</td>
<td>1440</td>
<td>0.62</td>
<td>0.18</td>
<td>0.62*0.18</td>
<td>= 24%</td>
</tr>
<tr>
<td>5</td>
<td>Cohen, 2014</td>
<td>2012-2013</td>
<td>1030</td>
<td>0.64</td>
<td>0.68</td>
<td>0.64*0.68</td>
<td>= 55%</td>
</tr>
<tr>
<td>6</td>
<td>Cohen, 2016</td>
<td>2011-2012</td>
<td>1001</td>
<td>0.69</td>
<td>0.41</td>
<td>0.69*0.41</td>
<td>= 42%</td>
</tr>
<tr>
<td>8</td>
<td>Cullen, 2015</td>
<td>2013</td>
<td>573</td>
<td>0.75</td>
<td>0.47</td>
<td>0.75*0.47</td>
<td>= 41%</td>
</tr>
<tr>
<td>10</td>
<td>Graziose, 2017</td>
<td>2015-2016</td>
<td>2571</td>
<td>0.64</td>
<td>0.38</td>
<td>0.64*0.38</td>
<td>= 47%</td>
</tr>
<tr>
<td>20</td>
<td>Schwarz, 2015</td>
<td>2014</td>
<td>373</td>
<td>0.52</td>
<td>0.64</td>
<td>0.52*0.64</td>
<td>= 49%</td>
</tr>
<tr>
<td>Average</td>
<td></td>
<td></td>
<td></td>
<td>0.64</td>
<td>0.46</td>
<td>0.64*0.46</td>
<td>= 29%</td>
</tr>
</tbody>
</table>

Study # refers to the number of the study in Figures 19 and 20.

+ The vegetable selection value represents the proportion of students in the study consuming school lunch who selected a vegetable item.

++ The vegetable consumption value represents the proportion of vegetables consumed among those who selected vegetables.

Note: The benchmark value in green is an average of the six studies. It represents the average percent of vegetables consumed among all students in the study eating school lunch.