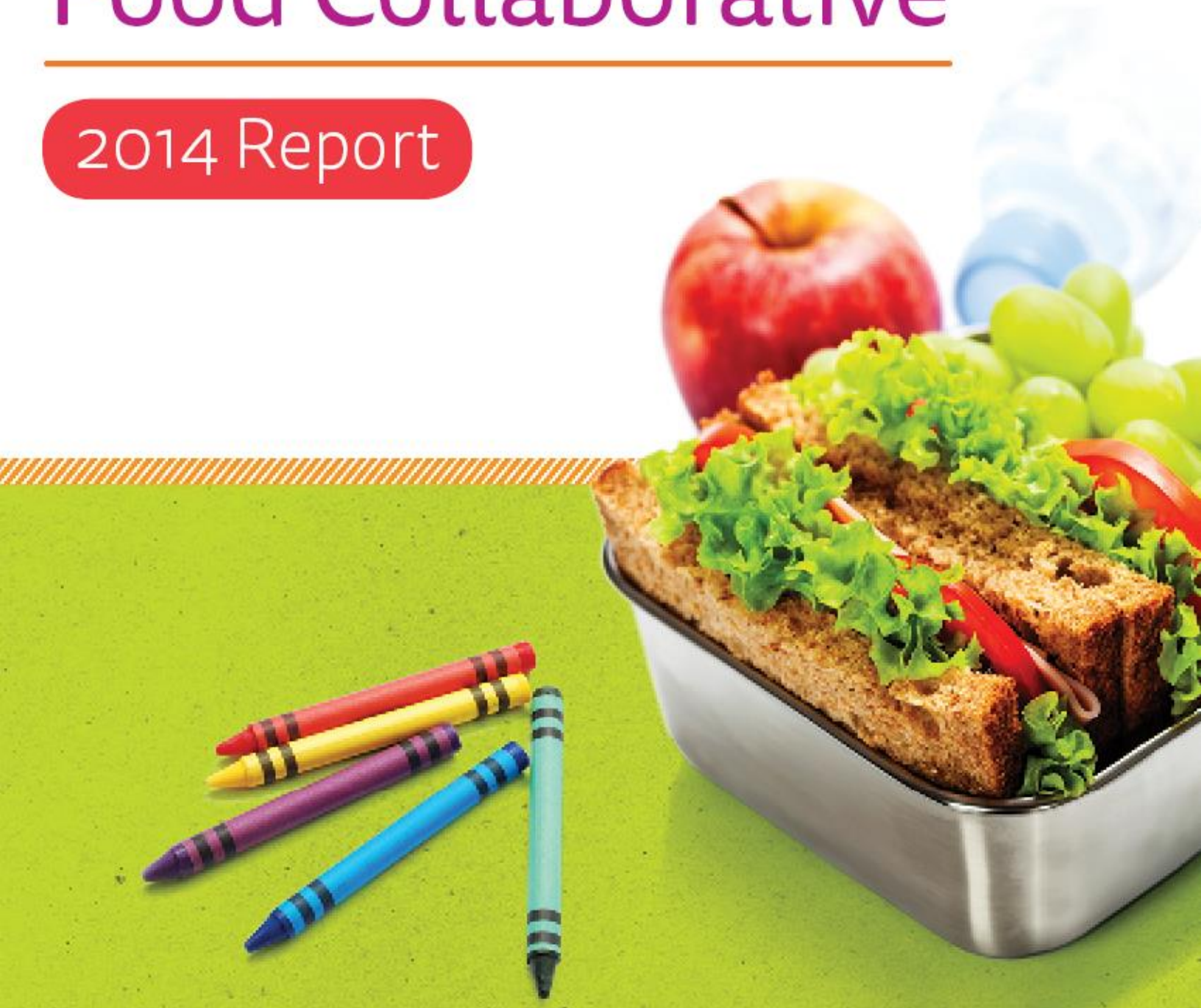
Healthy School Food Collaborative

2014 Report



SCHOOL HEALTH CONNECTION
HEALTHY KIDS + HEALTHY COMMUNITIES
A Program of The Louisiana Public Health Institute

HEALTHY SCHOOL FOOD COLLABORATIVE

Contents

Executive Summary

Background

Propeller, KIPP New Orleans Schools, the Louisiana Public Health Institute (LPHI) and participating schools and food service management companies have come together to participate in *The Healthy School Food Collaborative (HSFC)*, an assembly of school and community-based organizations in New Orleans that seeks to improve the school food experience through collaboration, evaluation, and data-driven policy change. The HSFC was launched in 2012 and funded by Propeller: A Force for Social Innovation, a New Orleans-based nonprofit social innovation incubator. The HSFC is operated by KIPP New Orleans Schools and Propeller as an umbrella School Food Authority (SFA). A SFA, an integral component of the HSFC, is an administering body for the operation of a school food program that receives federal meal reimbursements for school food. A SFA is responsible for ensuring that food and eligibility criteria are met and can be administered by a school district, several school districts, or an individual school.

The HSFC began its work with the mission of improving the healthfulness of school food, providing administrative support to schools for improving the healthfulness of school food, and reducing childhood obesity in southeast Louisiana. Working throughout New Orleans and Baton Rouge, the HSFC centers its efforts on providing students, families, and communities with delicious and nutritious meal choices, access to local and affordable food sources, and the development of lifelong healthy eating habits. The HSFC has established school food protocols and standards that exceed the recent standards mandated by the United States Department of Agriculture (USDA) which are addressed in the full report.

This report provides results of the evaluation of the HSFC work over the past two years. The evaluation of the HSFC has been conducted by the Louisiana Public Health Institute (LPHI), a member of the collaborative. LPHI is a statewide nonprofit whose overall mission is creating a healthier Louisiana. Because of LPHI's evaluation expertise and its interest in school health and wellness, LPHI viewed the collaborative as an entrée to developing deeper primary prevention strategies in schools around increasing healthy foods.

Evaluation Methods and Goals:

The overarching goal of the HSFC evaluation was to determine whether having a new SFA with higher nutritional standards and accountability could play a role in eliminating the obesity epidemic and improving the health of participating students. An additional goal was to provide valuable evidence to inform policy change related to school food administration practices. It was hypothesized that having a new SFA controlled by individual schools under a local lead school could autonomously select nutritious vendor options would:

1. Improve the healthfulness of school meals
2. Increase overall school food nutritional guidelines being met
3. Increase student utilization of school meals – breakfast, lunch, snack, and supper

4. Increase (or improve) student's healthy and nutritious food options
5. Affect student behavior towards healthier choices
6. Ultimately play a role in decreasing obesity rates through the provision of healthier foods options provided to New Orleans Public School students

The HSFC evaluation activities to date, which are described in detail in the full report, were divided into two phases and conducted over two years, 2013 and 2014. Participating school food vendors and participating schools changed in the study from Phase I to Phase II due to the continuing instability in charter schools; however, overall characteristics of the student makeup in schools were similar.

During Phase I (2013) participating school food vendors that were selected using the HSFC vendor selection process included Revolution Foods and Sodexo. The Phase I comparison school food vendor was Aramark. The Phase I HSFC schools were Benjamin Banneker, Lawrence Crocker, Harriet Tubman, Akili Academy and Arise Academy; and, non-HSFC schools were Mary Coghill, Paul Habans and Renew Schaumburg. Grades K-5 were included in Phase I.

During Phase II (2014), HSFC-selected school food vendors were Revolution Foods, Chartwells, and Sodexo, and the comparison vendor was also Chartwells. Notably, Chartwells served schools that were both in the HSFC (intervention) and not in the HSFC (comparison). The Phase II HSFC schools were Renew Schaumburg, Akili Academy, Arise Academy, Mary Coghill, and KIPP Central City. Phase II comparison schools were Dibert, Arthur Ashe, and Benjamin Banneker. Grades 4 and 5 only were included in Phase II.

Phase I: Phase I investigated differences in total consumption between HSFC and non-HSFC vendor schools. Phase I also focused on fine tuning the methodology through piloting the feasibility of conducting plate waste data collection at participating schools combined with menu analysis data to interpret consumption results at the micro and macro nutrient level. In summary, measuring the quantity of school foods consumed and determining how well school food vendors are meeting USDA standards were two important Phase II evaluation questions that were posed by the HSFC.

Phase II: In order to increase generalizability of Phase I findings, the plate-waste data collection and menu analyses were extended during Phase II from 1 day to 40 days, increasing total trays examined from 2,081 to 20,526. The Phase II evaluation added several new evaluation components. Fidelity monitoring was added, monitoring food vendors' compliance with school lunch menus compared to cafeteria offerings, and cleanliness of food preparation areas. In addition, Phase II added focus groups and questionnaires to investigate factors that affect student satisfaction with school meals. Environmental scans of the cafeterias were conducted to study different lunch cultures, cleanliness of lunch areas, lighting, smell, and other factors. Phase II also included collecting observational data on lunchtime characteristics. These characteristics are comprised of school policies or environmental factors that may influence rates of consumption such as timing of lunch period and the impact of the practice of silent lunches.

Summary of the Findings

Phase I Findings

- School Lunch Consumption. One of the most critical discoveries of the Phase I evaluation was that consumption patterns found in students throughout all of the eight schools included in the study were lower than what is recommended by USDA, despite whether the school food vendor was HSFC (Sodexo or Revolution Foods), or the comparison vendor (Aramark). Consumption levels were lowest with Revolution Foods (HSFC). Plate waste studies conducted with K-5th graders indicated that daily average consumption during lunch was 287.94 kilocalories (Kcals) (Kcals is commonly used by dietitians in the US, meaning the same as calories), approximately one-half of the 500-600 Kcals the American Heart Association recommends for children in that age range.
- USDA Standards. Menus analyses indicated that the three school food vendors (HSFC: Revolution and Sodexo; comparison: Aramark) all met USDA standards. Further detailed menu analyses indicated significant differences between the average kcal values for food served by each food vendor with Aramark (non-HSFC) having the highest Kcal value, Sodexo the next highest (HSFC) and Revolution the lowest (HSFC). Average sodium levels were significantly different with Sodexo (HSFC) having highest sodium values and lowest among Revolution foods (HSFC). The average total fat values were also significantly higher for Aramark (non-HSFC) and Sodexo (HSFC); however, Revolution (HSFC) offered meals with significantly less total fat and sodium in their meals than the other vendors. There was no difference in saturated fat levels among the vendors.

In summary, Phase I findings revealed pluses and minuses associated with each school food provider. Revolution Foods provided the healthiest lunch menu compared to the other vendors; however, consumption was lowest. Students served by Sodexo consumed the highest level of fruits and vegetables, but sodium content was also highest compared to other providers. Students with the Aramark provider had larger overall consumption, but the calories consumed were the least desirable nutrients. It is noteworthy that representatives from all three food vendors have been willing participants in the study, and have expressed willingness to make changes to increase nutrient value and consumption in schools they contract.

Phase II Findings

- USDA Standards. Menus analyses indicated that the three school food vendors (HSFC: Revolution, Chartwells, and Sodexo; comparison: Chartwells) all met USDA standards with the exception that the average reported kcals per meal for the non-HSFC vendor was higher than the USDA recommended, not required, amount.
- School Lunch Consumption. Similar to Phase I results, plate waste study results indicated that 4th and 5th grade students are consuming half or less than half of recommended calories during lunchtime. School policy and lunch culture also impacted consumption levels. Social lunches were associated with greater consumption levels than silent lunches. Students consumed about 9% more when recess occurred before lunch compared to recess after lunch. Consumption did

not change based upon whether menus were posted or not. Plate waste studies also demonstrated that students, on average, are consuming fewer vegetables than entrees or fruit.

- Environmental Factors. The cafeterias in the HSFC schools and comparison schools were reported as clean (clean serving area, clean dining tables, clean floors, etc.) on over 90% of days.
- Student satisfaction surveys and focus groups indicated that regardless of food vendor, students stated they desire more time for lunch, prefer barbeque chicken, pizza, chicken nuggets and hot dogs, and stated that they are still hungry after lunch (60%). Students also indicated displeasure that teachers were allowed to eat unhealthy foods during lunch while students were not allowed to do so.
- Other Phase II Findings. During Phase II, the Chartwells food vendor was substituted for Aramark and three new schools were substituted, necessitating some additional analysis of consumption patterns among all Chartwells schools (those participating and not participating in the HSFC), and the association with nutrition education and increased food standards at two of the Chartwells schools. Analysis revealed that that consumption levels among students from the Chartwells school with no nutritional programming were the highest for vegetable and fruit consumption, but the lowest for milk consumption. Also, students exposed to the maximal nutritional programs consumed the second lowest volume of vegetables and fruit among the four schools. No conclusions can be made regarding whether nutrition education is an effective or ineffective intervention in increasing consumption.

Summary and Recommendations

The results demonstrated that all food vendors met the USDA nutritional guidelines. However, menu analyses indicated:

- Significant differences in Kcal content by vendor during Phase I and II (see Tables 2 and 7 in full report)
- Significant differences in sodium content during Phase I and II (Tables 2 and 7); Revolution had the least sodium compared to other vendors
- Significant differences in total fat content between Revolution Foods and the other two vendors in Phase I and the highest total and saturated fat content with Sodexo in Phase II (Tables 2 and 7)

Per the second hypothesis that HSFC schools would select food vendors that increase school food nutritional guidelines, it was demonstrated that both Phase I and Phase II HSFC school food vendors all served meals that met the new USDA nutrition standards. However, whether food vendors met the HSFC nutrition standards was not determined through the Phase I or Phase II evaluation. In order to more specifically address this question, it is recommended for Phase III that the HSFC clarify how it interprets whether a food vendor is adhering to standards, so these criteria can be measured.

The third hypothesis was that participating in the HSFC vendor selection process would increase student utilization of school meals including breakfast, lunch, snack, and supper. While the baseline data gathered in Phase II alone was not able to determine an increase of student utilization, both Phase I and

Phase II evaluation results demonstrated that lower than recommended consumption of school lunch foods is a problem that should be addressed by the HSFC going forward. Clearly, student health is tied to consuming healthy foods, so increasing consumption of healthy foods must be a critical goal of future HSFC activities.

The fourth hypothesis was that HSFC selected vendors would increase (or improve) students' healthy and nutritious food options. The study was not able to assess improvement in the baseline year of the study (i.e., Phase II) but will be able to assess improvement over time in subsequent phases of the intervention and study.

The fifth hypothesis was that HSFC selected vendors would positively affect student behavior towards healthier choices. The study has not addressed if HSFC vendors are attempting to affect student behaviors; however, Phase II cafeteria observations and focus groups findings did show that school policies around silent lunches are associated with lower consumption and that youth consume at higher levels when lunch is scheduled after recess.

Both evaluation phases suggested some school lunch policy changes and changes in the lunch environment might increase overall consumption and increase consumption of healthier foods. Examples of policy change suggestions include schools prohibiting silent lunches, and/or banning the use of food or lunch time as the basis for punishment. Nutrition education was a variable present in the comparison schools, and no conclusive findings have demonstrated the efficacy of nutrition education in increasing consumption. Focus group studies suggested that students desire more time for lunch, and were avoiding foods that are unidentifiable. These findings suggest that the HSFC should work with schools to extend lunch periods to determine if such changes will increase overall consumption. School vendors can also ensure that food items are labeled and that students are able to identify the food. In addition, program strategies to increase student consumption of vegetables should be considered.

The sixth hypothesis was that the HSFC could ultimately play a role in decreasing obesity rates through providing healthier foods. The HSFC evaluation activities to date demonstrate that the HSFC does have the opportunity to make an impact on reversing childhood obesity if it takes a long-term view of the solutions. In the short-term, this process can begin with looking closer at nutrients by each HSFC food vendor to reduce further reduce sodium and fat content where indicated. Secondly, it will mean partnering with community agencies, to encourage students to increase consumption of healthier foods; and it will mean working with school leadership to change policies to make school meals a pleasant and overall healthy experience.

It is also critical to ensure that the long-term goal of developing healthier students and reducing obesity is not lost within the details of the HSFC evaluation process. The next phase of this work is an appropriate time to assess what the HSFC team has learned, to revisit the project goals, evaluation questions and the evaluation strategy. The HSFC team is to be congratulated regarding its willingness to take on such an ambitious project.

Healthy School Food Collaborative 2014 Evaluation Report

Background

The Healthy School Food Collaborative (HSFC) is an assembly of school and community-based organizations in New Orleans that seek to improve the school food experience by collaboration, evaluation, and data-driven policy change. The HSFC was launched and funded by Propeller: A Force for Social Innovation, a New Orleans-based nonprofit social innovation incubator. The HSFC is operated by KIPP New Orleans Schools (KNOS) and Propeller as a School Food Authority (SFA). A SFA, an integral component of the HSFC, is an administering body for the operation of a school food program that receives federal meal reimbursements for school food. A SFA is responsible for ensuring that food and eligibility criteria are met and can be administered by a school district, several school districts, or an individual school.

The HSFC began its work in 2012 with the mission of improving the healthfulness of school food, providing administrative support to schools for improving the healthiness of school food, and contribute to the reduction of childhood obesity in Southeast Louisiana. Working throughout New Orleans and Baton Rouge, the HSFC focuses on providing students, families, and communities with delicious and nutritious meal choices, access to local and affordable food sources, and the development of lifelong healthy eating habits. The HSFC has established school food protocols and standards that exceed the recent standards mandated by the United States Department of Agriculture (USDA). Since its inception, the HSFC Team has been interested in its effectiveness. Thus, an evaluation strategy was determined as critical for its development and sustainability, and was launched along with the collaborative. This report provides results of the full evaluation of the HSFC work over the past two years.

Meet the Team

The HSFC, developed by Propeller: A Force for Social Innovation with funding from the W.K. Kellogg Foundation, is a SFA for public charter schools operated by KNOS. Participating schools, Propeller, KNOS and the Louisiana Public Health Institute (LPHI) together form the HSFC, an assembly of school and community-based organizations in New Orleans that seek to improve the school food experience by collaboration, evaluation, and data-driven policy change.

KIPP New Orleans Schools

In its eighth year of operation, KNOS is building an influential network of open-enrollment public charter schools that provide low-income students from Kindergarten through 12th grade with the knowledge, skills, and character traits to succeed in college and the world beyond. Currently standing as the top-performing network of open-enrollment charter schools in Louisiana's Recovery School District (RSD), KNOS serves approximately 3,800 of the city's highest-needs students and aims to enroll some 5,300 students, or 13% of the public school population in our city, within five years.

As the program continues to grow and develop, it has become clear that in order to deliver on a commitment to improving life outcomes for all students, KNOS must work to provide not only health and wellness services for students, but also give students the resources they need to make healthy choices for themselves. Prompted by requests from school leaders within the KNOS network and demonstrated interest expressed by several other charter operators across the city, KNOS decided to register as a Federal SFA at the beginning of the 2012-2013 school year. Initially serving the nine schools in the KNOS network and 17 additional schools, KNOS began to research and strategize different approaches for providing healthier meal options to the students being served. Under the leadership of KNOS' James Graham, the SFA was granted a fellowship with the "Social Innovator Accelerator" program through Propeller, a New Orleans-based local social innovation incubator, to increase the amount of healthy foods available to students in mid-2012.

Propeller: A Force for Social Innovation

Propeller: A Force for Social Innovation, Inc. is a New Orleans hub for collaboration and innovative change. As a New Orleans-based nonprofit organization founded in 2009, Propeller seeks to create social, environmental, and economic impact in New Orleans by incubating ventures that have the potential to solve our city's most pressing issues—including the ongoing obesity epidemic within Louisiana. The HSFC is an initiative of KNOS and Propeller, in which a Propeller-funded SFA serves a healthy breakfast, lunch, snack, and supper to 43% of all New Orleans public schools. The KNOS and Propeller hold school vendors accountable to raised nutritional standards.

Louisiana Public Health Institute's School Health Connection

The HSFC is evaluated on an annual basis by LPHI. Over the past two years, LPHI's School Health Connection (SHC) program has provided funding, leadership, coordination and evaluation support to the HSFC. This investment has served to further SHC's mission of promoting healthy school communities so that children and youth in the Greater New Orleans (GNO) area can reach their full potential. SHC works in schools throughout the GNO area to support nutrition education programming, increase healthy eating and physical activity among school students and staff, and expand health services. SHC conducts much of its work in Orleans Parish schools using the Coordinated School Health Model, developed by the Centers of Disease Control and Prevention. A key component of SHC's work is supporting changes in school nutritional services, with an ultimate goal of increasing consumption of healthy foods and decreasing the child and adolescent obesity trend. In 2013, LPHI's SHC entered into a partnership with the HSFC to evaluate the initiative's impact in New Orleans public schools.

External Partners

The HSFC would like to thank all participating external partners in its programming and evaluation efforts:

Schools and Charter Management Organizations

- KIPP New Orleans (KIPP Central City Primary)
- The Recovery School District (Benjamin Banneker Elementary School)
- FirstLine Schools (Arthur Ashe Elementary School and Dibert Elementary School)
- Paul B. Habans Charter School
- ARISE Schools (Arise Academy)
- ReNew Schools (ReNew Schaumburg Elementary School)

- The Better Choice Foundation Inc. (Mary D. Coghill Elementary School)
- Crescent City Schools (Harriet Tubman Charter School)
- New Orleans College Prep (Lawrence D. Crocker Arts and Technology School)
- Akili Academy of New Orleans

Food Service Management Companies

- Aramark
- Revolution Foods
- Chartwells
- Sodexo

We would particularly like to thank the W.K. Kellogg Foundation for funding this program, evaluation, and ongoing efforts to increase consumption of healthy foods and reduce childhood obesity in New Orleans and Southeast Louisiana.

HSFC Programming

Need for HSFC in Louisiana

The state of Louisiana has one of the highest rates of overweight and obese children and adolescents in the United States. Louisiana is ranked fifth-highest in the country in obesity[i] with approximately one in three Louisiana children being overweight or obese.[ii] The Department of Health and Hospitals, during the 2008-2009 school year, documented that height and weight were taken on approximately 13,000 children 2-19 years old seen in school-based health centers in Louisiana and revealed that 47.54% were overweight or obese and 28.98% were obese.[iii]

In New Orleans, there are several areas where 87% of residents live in "food deserts", or locations more than one kilometer from a grocery store, with the highest of these rates in African American and lower socio-economic status neighborhoods.[iv] The food options of these residents are often limited to the selection available at neighborhood convenience stores that typically offer a limited amount of fruits and vegetables and a higher snack to fruit/vegetable ratio, than grocery stores or supermarkets.[v] Lack of access to nutritious foods has a detrimental effect on the health of all neighborhood residents, especially children and adolescents.

African American students comprise 90% of the New Orleans Public Schools' student population, and many of these students live in food deserts.[vi] School meals can constitute up to 47% of children's and adolescent's daily energy.[vii] In New Orleans, 82% of public school students qualify for free or a reduced-priced lunch; thus, school lunches can provide an important opportunity to positively affect the food consumption patterns of this student population.[viii]

However, school meals need improvement. The third School Nutrition Dietary Assessment Study found that less than one third of schools in the study offered lunches that met federal standards for total fat and saturated fat. In addition, 42% of school lunches did not offer a fresh fruit or raw vegetable daily.[ix]

HSFC History

In 2010, the New Orleans Food Policy Advisory Committee (FPAC) released their recommendations for improving the quality, experience, and reach of National School Lunch Program (NSLP) foods in New Orleans stemming from one in five children in Louisiana being obese.[x] Much of FPAC's recommendations centered on transforming school-based food programs as the single most effective strategy to improving the health and well-being of children. One key recommendation centered around SFAs and food service management companies (FSMC) serving breakfast, lunch, and snacks that exceed USDA minimum nutrition standards. Almost two-thirds of all American children access food and consume more than a third of their daily total calories at school.[xi] Awareness of this critical moment and in line with FPAC's recommendations on school food service authorities and FSMCs, the New Orleans food landscape began to change.

What is a School Food Authority?

A School Food Authority (SFA) is an administering body for the operation of a school food program that receives federal meal reimbursements for school food. A SFA is responsible for ensuring that food and eligibility criteria are met and can be administered by a school district, several school districts, or an individual school.

In 2009, the Louisiana Association of Public Charter Schools (LAPCS) began surveying charter schools in New Orleans and Baton Rouge around operational challenges they faced. The LAPCS discovered that school food was a point of dissatisfaction—principals and teachers were dissatisfied with both the quality of food and the food reimbursement administrative process. Propeller, in partnership with the LAPCS, set out to recruit a Local Educational Agency (LEA) charter school and/or an existing LEA that had an SFA to become an "umbrella SFA" for other LEA charter schools that were interested in healthier school food. Charter schools were initially reluctant because of the audit and financial liability involved in being responsible for other charter schools' food programs. Because Type 5 charter schools are considered their own LEA, it was possible for schools to become their own SFA and bid their own school contracts independently of a larger school district.[1] However, it was difficult for small charter schools to become their own SFA and take on the audit, processing, and reimbursement challenges of the National School Lunch Free and Reduced Lunch program.

[1] The LAPCS defines Type 5 charter schools as pre-existing public schools that are under the jurisdiction of the Recovery School District (Louisiana Association of Charter Schools, 2014).

New Orleans Education Reform

Historically, New Orleans Public Schools (NOPS) were ranked as some of the lowest performing schools in the United States. In 2004, 63% of public schools in New Orleans were deemed "academically unacceptable" by Louisiana accountability standards, compared to 8% of public schools across Louisiana.[xii] In addition to poor educational outcomes, the district had significant financial problems, and physical facilities were dilapidated and in need of repair. In August 2005, Hurricane Katrina devastated the city of New Orleans and its public schools further, displacing approximately 64,000 students and 7,500 public school employees.[xiii] Post-Katrina, as recovery of the city began, the educational landscape shifted, and a new school system emerged. The new system included all of NOPS being governed by not one, but two schools boards. This initially meant the Orleans Parish School Board (OPSB) the previous local entity for school governance for all schools continued to oversee 17 schools—five directly managed by the district and 12 new charter schools. The state-run Recovery School District (described below in this report) began operating 39 schools—22 direct-run and 17 charter schools. Initially this left 57% of all NOPS students enrolled in a charter school—the largest percentage of any district in the United States. Today approximately 95% of NOPS are now charter-run. Not only did reopening 58 schools in less than 2 years in the wake of one of the worst disasters a US city had ever experienced drastically change the way educational institutions fared, but ongoing operational problems in facilities, transportation, and meal services continue to plague schools.[xiv] As a city whose education systems has completely shifted in less than a decade to a new complex model of education, schools and operators continue to struggle to make systemic change owing to fragmentation, meet performance outcomes, and maintain key and critical programming for students throughout the city. Despite some systems stabilization, according to the Cowen Institute, "Since Hurricane Katrina substantial changes have occurred at both the system and school levels. Many of these changes have provided New Orleans with the building blocks to create an excellent public education system. Yet with change come challenges. Public education has many substantial obstacles to overcome before it can provide all students with a high-quality educational and developmental experience."

The Recovery School District of Louisiana

The Louisiana Recovery School District (RSD) is a special statewide school district administered by the Louisiana Department of Education that was created through a legislative act in 2003 to take over underperforming schools and transform their educational outcomes. The majority of RSD schools are located within New Orleans (with a limited number in East Baton Rouge, Caddo and Pointe Coupee Parishes). The RSD currently overseas the fifth largest school district in Louisiana based on student population.

In 2012 Propeller received a grant from the W.K. Kellogg Foundation (WKKF) and subsequently provided seed funding to KNOS to serve as the "umbrella SFA." KNOS is a charter management organization with a strong operational reputation in the charter school community. The goal of this "umbrella SFA" was to allow charter schools in South Louisiana to independently select a healthy food vendor, creating the

opportunity for thousands of public school children in New Orleans and Baton Rouge to eat nutritious school lunches, breakfasts, snacks, and suppers daily that included no fried products, no high-fructose corn syrup, no canned fruits and vegetables, and food that was prepared fresh daily from scratch.[xv] This process, normally cost-prohibitive, arduous, and bureaucratic, was streamlined by KNOS allowing others to operate autonomously underneath their SFA designation. KNOS's role would also be to enforce a set of food nutrition standards that were higher than the USDA's. The hope was that through this expansion of the traditional SFA, nutritional school lunch options would increase and potentially affect the larger obesity epidemic facing school-age youth in South Louisiana. Thus the HSFC is operated by the KNOS SFA.

In the 2012-13 school year, the HSFC launched with 28 New Orleans public schools with a total enrollment of 10,352 students. To join the SFA, schools agree to healthier school food standards and pay a management fee to the KNOS SFA for school lunch administration processing. In the 2013-14 school year, 34 Orleans Parish schools serving a total enrollment of 14,284 students participated. As of school year 2013-2014, Orleans Parish has 88 public schools with a total enrollment of 44,791 students. Thirty-nine percent of all public schools in New Orleans are now under the Healthy Food SFA, and 33% of all public school students attend a school under the SFA. The average numbers of meals served per month were: 164,619 healthy lunches served/month; 125,174 breakfasts served/month, 98,083 snacks/month, and 50,330 suppers/month.

HSFC Services

The HSFC offers its schools many different services under contractual agreements. These services include:

1) Annual school lunch program audits
    - Conduct on-site reviews to ensure our school partner's meal claims are based on the counting system implemented and yields the actual number of reimbursable meals served for each day of operation
    - Offer outreach and support to school staff regarding Federal and State regulatory compliance measures

2) Free and reduced meal eligibility application processing
    - Provide state agency eligibility applications and household letters with income eligibility guidelines to all school partners for free and reduced-price meals

3) Community Eligibility Provision (CEP) application processing
    - Provide assistance to eligible schools electing for CEP reimbursement and process applications with the state agency

4) Federal meal claim submissions and reimbursements
    - Prepare timely and accurate federal meal claims
    - Provide detailed claim report for approval prior to state agency submission
    - Disperse reimbursement payments within ten days of check receipt

5) Food Service Vendor management
    - Oversee Food Service Management Company staff to ensure operational, regulatory and contractual compliance
    - Enhance relationship between schools and food service Management Company through food tastings, focus groups, wellness fairs, increased local offerings in the cafeteria, and promotional opportunities

6) Set-up and management of Point of Sale (POS) system
    - Install and update POS system for school partners
    - Provide technical assistance and training on POS system for school partners
    - Manage file uploads, user data and reporting in POS system for school partners with food service management staff

7) Nutritional and food education programs
    - Promote, coordinate and make available experiential programming opportunities with interested school partners

8) Wellness Policy and implementation
    - Provide school wellness policies with suggested implementation guidelines to all school partners

Program Evaluation Goals

LPHI's SHC in partnership with the HSFC collaborated to evaluate this new initiative. The overarching goal of the evaluation was to determine whether having a new SFA controlled by individual schools with raised nutritional standards and accountability could play a role in eliminating the obesity epidemic and improve the health of participating students. An additional goal was to provide valuable evidence to inform policy change related to larger school food administration practices. Initially, it was assumed that having a new SFA controlled by individual schools or a local lead school that can autonomously choose nutritious vendor options would:

- Improve the healthfulness of school meals
- Increase overall school food nutritional guidelines being met
- Increase student utilization of school meals – breakfast, lunch, snack, and supper
- Improve students' healthy and nutritious food options
- Affect student behavior towards healthier choices
- Ultimately play a role in decreasing obesity rates through the provision of healthier foods options provided to New Orleans Public School students

The evaluation of the impact of higher standards of the HSFC was separated into two distinct phases. Moreover, the final evaluation goals of the HSFC are two-fold. The first goal was to establish a baseline to evaluate the ongoing efficacy of higher standards posed by the HSFC in increasing students' access to and consumption of healthy foods in schools. Thus far, two phases of the evaluation study have been completed. Both Phase I and Phase II addressed this goal by conducting plate waste assessments and combining this data with menu analysis. When combined, these two data sources detail the consumption of lunches at the nutrient level of students attending HSFC schools compared to non-HSFC schools.

The second goal of this continued evaluation is to investigate other factors relating to school food consumption that may ultimately affect student consumption patterns. Phase II extended the plate waste methodology by adding additional components that would be utilized to investigate additional

factors that may affect school lunch consumption, such as student satisfaction with school meals and environmental school cafeteria characteristics.

Phase I and Phase II of the HSFC Evaluation share the same over-arching goals of assessing the HSFC initiative in New Orleans, Louisiana. Importantly, each evaluation phase was designed as post-intervention only studies; therefore, the overall design will use a longitudinal approach in order to fully examine improvements in healthfulness of school meals and increases in student consumption of healthier food options. Phase II serves as the baseline for future evaluations of the HSFC. Phase I and II evaluation designs utilized schools that are not members of the HSFC as comparison schools. Several of the comparison schools had nutrition education and school lunch interventions already in place and used the same vendor as the intervention schools. Thus, additional analyses among these schools were conducted to determine whether nutritional interventions at comparison schools would influence consumption. Particular attention is paid to the need for reducing obesity in populations that are already vulnerable to health disparities due to socio-economic circumstances All participating schools in both Phase I and Phase II were selected owing to the similarity of the student bodies. All schools were elementary schools with predominantly African-American students. Of these students, more than 80% qualified for a free or reduced-priced lunch.[xvi]

The Phase I pilot was designed to be a short and cost-effective evaluation that tested the feasibility of using the plate waste method in local schools. Phase I included eight schools and measured food consumption at a single lunch-period per school. Phase I also piloted combining plate waste measures of consumption with nutrient information for school lunch items. Phase I demonstrated the efficacy of the methodology and analysis procedures, thus, was determined to be successful.

Phase II of the HSFC evaluation was substantially larger. Instead of collecting data at each school on only one day, data were collected at each school on 40 consecutive school days, making it more generalizable. This took place between January 27 and April 4, 2014. The design of Phase II also included more data collection tools. In addition to focusing on consumption data, the Phase II evaluation administered satisfaction surveys to students and collected information about environmental characteristics of the cafeteria twice during the data collection period at each school. Moreover, Research Assistants completed the Fidelity Monitoring Tool during each day that they collected plate waste. This tool was used to assess on-site adherence to food vendor guidelines and menu publications.

HSFC Evaluation Phase I

January–December 2013

Phase I Overview

The goal of Phase I was to assess the impact of the new SFA on select New Orleans Public Schools (N=8) during the 2012-2013 school year by comparing FSMC vendors. Two HSFC vendors, Sodexo and Revolution Foods, were compared to one non-HSFC vendor, Aramark, as well as to each other. It was hypothesized that HSFC vendors would offer more nutritious foods than the traditional non-HSFC vendor, and that students in HSFC schools would consume more healthy food.

Phase I Objectives

The objectives of the HSFC Phase I Pilot were to:

1. Investigate differences in total consumption between HSFC and non-HSFC participating schools.
2. Pilot the feasibility of conducting plate waste data collection at participating schools.
3. Combine plate waste and menu analysis data to interpret consumption results at the micro- and macro-nutrient level.

Phase I Methodology

Phase I Study Design

The evaluation followed a mixed-methods design and consisted of two parts. Part 1 of the evaluation included an in-depth menu analysis of each food vendor (both HSFC and non-HSFC) and analyzed the nutritional content of lunch menus for the month of January 2013. Part 2 of the evaluation evaluated student consumption during lunchtime using a plate waste methodology. Although conducted separately, the innovation of this project rested in the combination of the results from each part of the evaluation.

Phase I, Evaluation Part I: Menu Analysis

A menu analysis is an investigation into the nutritional composition of all of the meal items that are served within a single menu. Nutritional content for all lunches offered during the month of January 2013 were requested and received from all three food vendors. Daily averages per nutrient (sodium, carbohydrates, total fat, and saturated fat) were organized by date and food vendor and then entered into a spreadsheet for comparison. One nuance to this methodology is that some food vendors offered more than one entrée, fruit, or vegetable option per day. Thus, in order to quantify the *average* of nutrients offered by food vendor for each meal on each particular day, daily weighted averages of each nutrient were constructed depending on the popularity of the item. These values were given to the researchers directly from the food vendors and were based off of inventory calculations.

This menu analysis allowed for two comparisons. First, the research team was able to compare vendors against each other to determine differences in nutrition by food vendor. Second, each food vendor was compared against the contractual nutrition obligations set forth by the USDA.

Phase I, Evaluation Part II: Plate Waste

The plate waste methodology has become a standard in school food research and allows researchers to quantify participant consumption by measuring the participant's uneaten food and comparing that value to a 'pre-meal' value. The current study used a weight methodology, whereby a standard "pre-weight" for each food item was determined prior to the beginning of the meal and a "post-weight" measure of the weight of the leftover food for each student was measured at the end of the meal. These weight measurements were used to calculate the percent consumed of each item. The plate waste methodology was conducted at eight different schools on consecutive school days from January 7, 2013 to January 16, 2013. Three schools served food from Revolution Foods, three schools served food from Aramark, and two schools served food from Sodexo.

A team of 14 graduate student research assistants from the Tulane School of Public Health and Tropical Medicine were hired to assist the SHC team with the plate waste data collection. All research assistants, as well as all school lunch staff, were trained on the study's protocol prior to data collection. Research assistants were trained on their particular role during each of the eight days of the study period (discussed below), what data to record, how to use equipment (scales and computers) appropriately, and the study's procedures for set up and clean up. School lunch staff was trained on the study's purpose, the set-up of the study during the eight days of the study period in-schools and how to give standardized servings to each student in the lunch line.

At the beginning of each data collection day at each school, the two research assistants were responsible for collecting ten standard lunches and weighing each item separately to quantify the "pre-lunch" weights. From these ten weights, the average "pre-lunch" weight of each food item was calculated. Following the meal, the uneaten food items on each student's tray (all of which were pre-numbered with a "tray ID" to ensure all were counted each day) were then weighed separately. The percent consumed of each item was calculated using the standard pre-weights and the individual post-weights of each item.

While students stood in line and waited for their lunches, an evaluation manager instructed the students not to throw away their trays after lunch but to leave them on their tables or to give lunch trays to research assistants who were collecting all trays on a moveable rack. Students were also instructed not to share or trade food, as well as to raise their hand if they did not want their tray to be weighed and wanted to throw it away themselves. On a daily basis, approximately four research assistants were responsible for collecting and transporting lunch trays to the research assistants responsible for weighing and recording the data. In all schools, "weighing stations" were assembled in an available area in the kitchen or nearby storage areas. Weighing stations included one food scale (OXO Good Grips Food Scale, model number 1130800) and one laptop computer for data entry. Four teams of two research assistants each worked together to record data on each lunch tray. One research assistant removed and weighed each uneaten item from the tray, and the second research assistant recorded the data in a pre-made Microsoft Excel spreadsheet. Weight (in grams) was recorded for the following uneaten food items:

- Main (e.g. burger)
- Sub-main (e.g. burger bun)
- Fruit (e.g. orange)
- Vegetable (e.g. corn)

- Milk (e.g. Skim Milk)

Two additional research assistants collected demographic information on each student as they entered the lunch line and received their trays. The lunch options that the student chose were also recorded, as some food vendors offered more than one choice to students per meal component. For instance, if pizza, burgers, and hot dogs were all offered for the "Main" part of the meal, the research assistants collecting demographics made note of which entrée was chosen on the demographic forms. Demographic data and consumption data recorded by the weigh teams were linked by the unique tray ID that was labeled on each food tray.

Phase I Sample Size

The number of trays that were measured for plate waste averaged 260 per school. Plate waste measurements were collected from 2,081 trays in total.

Table 1. Phase I Sample Characteristics

Membership	Food Vendor	School	# Students	% Female
HSFC	Revolution Foods	Benjamin Banneker Elementary School	195	56%
HSFC	Revolution Foods	Lawrence D Crocker College Prep	207	54%
HSFC	Revolution Foods	Harriet Tubman Charter School	321	49%
HSFC	Sodexo	Akili Academy	305	47%
HSFC	Sodexo	Arise Academy	339	48%
Non-HSFC	Aramark	Mary D Coghill Elementary School	305	49%
Non-HSFC	Aramark	Paul B Habans Elementary School	183	47%
Non-HSFC	Aramark	Schaumburg Elementary	226	45%

Phase I Data Collection Tools

Phase I served as a pilot to test the plate waste methodology. Data collection tools included the weighing scale and the demographic data sheets that researchers used to record student meal choices and characteristics.

Phase I Results

Analysis of variance (ANOVA) was used to examine differences among the vendors, and significant results were further examined with pairwise comparisons. The results of the Menu Analysis are shown in Table 2. Most importantly, the results demonstrate that all three food vendors meet the federal nutritional guidelines set by the USDA. There was a significant difference between the average Kcal values for food served by Aramark and Sodexo. Average sodium levels were significantly different amongst all food vendors, with Sodexo's levels being significantly higher than the other vendors. The

average total fat values were not significantly different for Aramark and Sodexo, however Revolution offered significantly less total fat in their meals than the other vendors. There was no difference in saturated fat levels among the vendors.

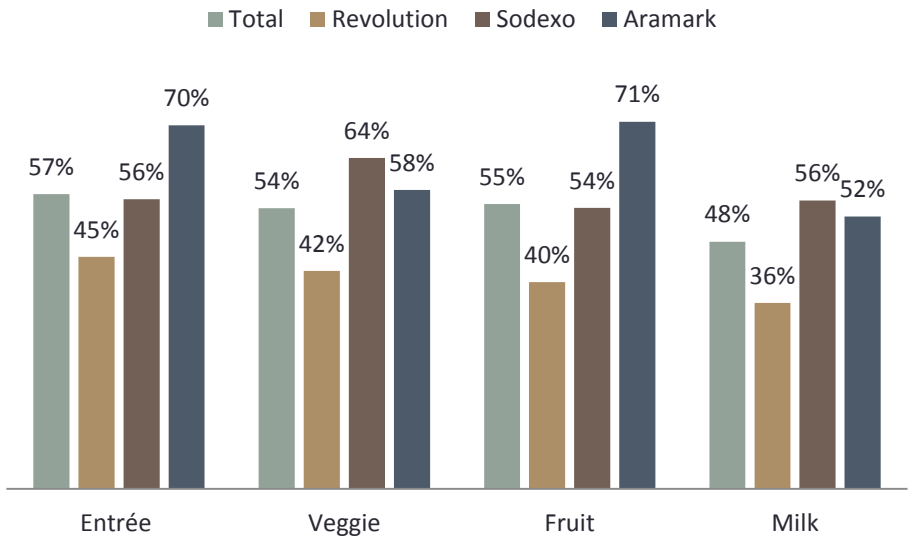
Table 2. Phase I Results: Menu Analysis Results

	Table 2	Vendor	Mean	p-value	Result	Federal requirements
Nutrient	**Kcal**	Revolution	582 kcal	0.0181	Significant difference between vendors [c]	550-650 kcal
		Sodexo	625.89 kcal			
		Aramark	572 kcal			
	Sodium	Revolution	663.17 mg	0.0000	Significant difference between vendors [a b c]	1200 -1500 mg
		Sodexo	1422.44 mg			
		Aramark	919.5 mg			
	Total-fat	Revolution	13.92 g	0.0106	Significant difference between vendors [a b]	< 30 % of Energy
		% of Energy	22 %			
		Sodexo	17.7 g			
		% of Energy	25 %			
		Aramark	17.15 g			
		% of Energy	27 %			
	Saturated-fat	Revolution	4.42 g	0.2382	No Significant difference between vendors	< 10 % of Energy
		% of Energy	7 %			
		Sodexo	5.27 g			
		% of Energy	8 %			
		Aramark	5.18 g			
		% of Energy	8 %			

a Difference between Revolution and Sodexo
b Difference between Revolution and Aramark
c Difference between Sodexo and Aramark

We next evaluated the amount students consumed of their lunches. Figure 1 shows by food vendor the percent of each food item that was consumed on average. The overall consumption of all food groups was lower than recommended by the American Heart Association, at around 50%. Students who were offered food from Aramark consumed more of their entrée and fruit compared to students of other schools, while students offered food from Sodexo consumed a higher percentage of their vegetable selection and milk. Notably, students are only consuming around half of the food that they are offered across all food items and vendors.

Figure 1. Phase I Results: Percent Consumption of Lunch Food Items by Vendor



Consumption data was then combined with nutrition data provided by the vendors to evaluate the amount of nutrition consumed by students. Table 3 shows results from the bivariate analysis for each nutrient. For all nutrients included in the analysis, statistical differences were found between all food vendors. Students eating food served by Aramark consumed significantly more KCals and Total Fat than those eating food served by Sodexo and Revolution. This trend also existed for Cholesterol, Carbohydrate, and Protein values, such that students eating food offered by Aramark consumed more than those offered food from Sodexo and Revolution. Students consumed significantly higher levels of sodium in schools that served food from Sodexo than Aramark and Revolution. Students eating food from Sodexo also consumed the highest amount of Dietary Fiber, compared to Aramark and Revolution. In conclusion, all consumed nutrients were highest for Aramark, with the exception of Sodium and Dietary Fiber values. Students offered food from Revolution—on average—consumed the lowest value of all nutrients.

Table 3. Phase I Results: Combining the Plate Waste and Menu Analysis Results

Table 3		Aramark N = 714	Revolution N = 723	Sodexo N= 644
Nutrient	Kcal	366.47 kcal	218.91 kcal	278.44 kcal
	Total Fat	12.47 g	5.65 g	7.91 g
	Cholesterol	48.95 mg	22.50 mg	39.74 mg
	Sodium	529.15 mg	247.72 mg	631.38 mg
	Carbohydrate	44.98 g	31.26 g	34.80 g
	Protein	20.05 g	12.36 g	14.59 g
	Dietary Fiber	4.48 g	3.34 g	4.67 g

All comparisons between vendors across nutrient types are singificanty different at p<.05.

In order to make the results that combine plate waste and menu analysis findings more understandable, the evaluation team summarized findings by discussing Pros and Cons of each participating vendor from the Phase I pilot. These translations are summarized below in Table 4.

Table 4. Phase I Results: Pros and Cons of Each Vendor

	REVOLUTION	SODEXO	ARAMARK
PROS	• Most healthy option • (Students are getting the "bang for their buck")	• Students have highest consumption of fruits and vegetables	• Students are getting more energy because they are consuming a higher caloric amount
CONS	• Students have the lowest calorie consumption	• Students have highest consumption of sodium	• Calories consumed are coming from the least desirable nutrients

Phase I Implications

One of the most critical discoveries of the evaluation was the lower than recommended consumption patterns found in students throughout all schools included in the study. Despite there being a general awareness of the critical lunchtime time period schools have a variety of lunch cultures that may affect consumption. Various factors beyond just the availability of certain foods and beverages appear to influence what students consume at school, and therefore, it is important to conduct research evaluating actual levels of consumption in order to better inform policies related to school nutrition. Research indicates that some of the main factors that may influence waste in school lunch programs include: serve only service or offer versus serve service[xvii], scheduling recess period before or after lunch[xviii], the length of the lunch period[xix], the presence of vending machines on campus, purchasing of competitive foods with lunch, food preparation method[xx], student satisfaction, and food preference (all influenced by diversity of food choices, sufficient space at the table, hygiene of the eating atmosphere, food attractiveness, variety of food offered, friendliness of the lunch staff).[xxi] Thus, further evaluation is needed to determine the differences potentially to be found in consumption patterns based on these other factors.

Phase II of the HSFC evaluation was designed to take into account several of the limitations of Phase I. Because the pilot evaluation only included one day of data collection per school, many generalizations with these results cannot be made. Moreover, each school had its own unique culture and administrative rules during lunchtime which affected student behavior, and therefore may have also affected consumption patterns. Lunch menus for the consumption analysis were also chosen based on how convenient the menu would be for research assistants to weigh; therefore, we only have consumption results for particular lunch offerings. During data analysis, missing values were imputed with the average values from that school in order to retain sample size.

Overall, the Phase I pilot of the HSFC program presented the evidence that this type of multi-faceted research could be conducted in participating HSFC schools in New Orleans. The Propeller and SHC teams continued to work together throughout 2013 and were able to address the limitations of the Phase I pilot in the development of the Phase II evaluation. Phase II, which took place in 2014, is discussed in the next part of this report.

HSFC Evaluation Phase II

January–December 2014

Phase II Overview

Preliminary findings from the Phase I pilot evaluation demonstrated that regardless of school vendor, students at all participating schools were consuming no more than an average of 300 calories per lunch. The American Heart Association recommends that females aged 9-13 years consume 1,600 calories per day and males aged 9-13 years consume 1,800 calories per day.[xxii] Following a diet of three meals per day, this would equal a recommended lunch caloric intake of *at least* 500-600 calories. Similarly, the USDA recommends lunch meal calories for students in grades kindergarten through 5 should be between 550 and 650.[xxiii] Therefore, New Orleans public school students enrolled in last year's evaluation were not consuming the recommended calories during lunchtime through school lunch. These findings warrant further investigation into the factors associated with student lunch consumption, as research shows that children who suffer from hunger and poor nutrition are at a greater risk of poor attendance, behavior problems, and poorer academic performance.[xxiv] Understanding the many factors that influence student consumption of school food is an important first step to increasing student consumption in the cafeteria and thereby, potentially improving student wellbeing.

Although the literature is minimal, existing research points to certain factors that may influence student consumption of school food other than the food itself. For instance, student satisfaction with school food may influence the student's likelihood of consumption, and satisfaction may vary depending on the diversity of food choices, sufficient space at the table, and hygiene of the eating atmosphere.[xxv] A study that investigated student satisfaction in a high school population found that factors such as food attractiveness, variety of food offered, and friendliness of the lunch staff were associated with higher levels of student satisfaction.[xxvi] The current study seeks to measure student satisfaction not only to investigate its potential effect on consumption levels, but also as a quality improvement tool that can be utilized by participating FSMCs.

Additionally, it is also possible that amendable school policies have the potential to influence student consumption. Research has indicated that school regulations and policies are associated with whether or not students eat unhealthy foods.[xxvii] School policies such as silent and social lunch, the amount of teacher-to-student interaction during lunchtime, and the presence of vending machines in the school may impact student behavior (i.e. consumption) during lunchtime. It is also possible that brief interventions such as health promotion posters in cafeterias and school classrooms positively impact student consumption of school food. Research investigating the influence of these factors is limited, though one study found consumption differences between intervention (e.g. exposure to a health curriculum reinforced by motivational posters) and non-intervention schools to be "inconclusive".[xxviii] More research is needed in order to investigate the effect of school policies and environmental characteristics that may lead to increased food consumption. This type of research could point to cost-effective strategies for improving student consumption of school food.

Phase II Objectives

The objectives of the HSFC Phase II Evaluation are to:

1. Measure student lunch consumption at selected HSFC and non-HSFC schools using a plate waste methodology.

2. Conduct a menu analysis to assess vendor adherence to USDA nutritional standards.
3. Collect observational data on lunchtime characteristics. These characteristics are comprised of school policies or environmental factors that may influence rates of consumption.
4. Evaluate student satisfaction with school food among HSFC and non-HSFC schools through surveys and focus groups.

Phase II Methodology

Phase II Evaluation Design

The spring 2013 pilot set the stage for the 2014 evaluation, demonstrating the feasibility of spring 2013 methodologies. Moreover, the current study expands the spring 2013 evaluation by collecting data at participating schools five days per week for eight weeks, rather than only one day at each participating school. Due to the more extensive data collection period and additional measures, we were unable to collect data from every class at each school, so Phase II data collection involved 4th and 5th graders only.

The evaluation was a post-test only quasi-experimental study design to compare the lunches of HSFC and non-HSFC schools. Three different school food vendors were included in the Phase II evaluation: Revolution Foods, Sodexo, and Chartwells[2]. Revolution Foods and Sodexo each serve two of the HSFC schools. Chartwells serves lunches to three non-HSFC schools, in addition to one HSFC school to which they are held to the higher standards. The two Sodexo schools and two Revolution Foods schools constituted two intervention conditions, along with one Chartwells HSFC school. Thus, five total schools that are members of the HSFC were included in the study. Three comparison schools from Chartwells were selected and constituted one comparison condition. In total, there were eight participating schools (five that are members of the HSFC, and three that are not members of the HSFC). The treatment groups are described below in Figure 2.

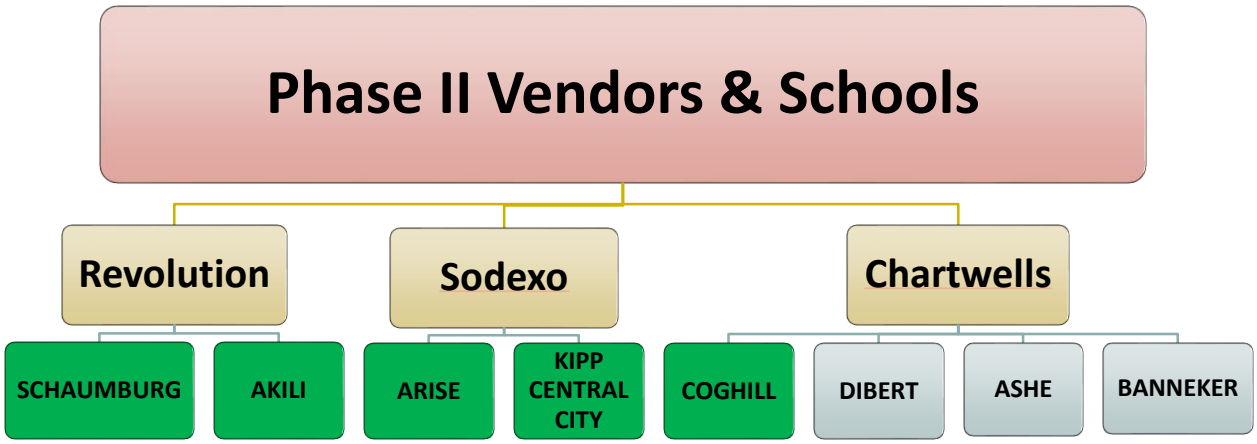
Each participating school was assigned a team of three of 24 total research assistants (RAs) involved in the evaluation. Daily tasks for RAs included on-site plate waste data collection and completion of the fidelity monitoring tool. Student satisfaction surveys and environmental scans of the cafeteria were completed by SHC staff once at the beginning and once at the end of data collection.

[2] Aramark, the third vendor in Phase I, left the region, so a comparative non-HSFC vendor was chosen for Phase II.

Nutrition Education Programming in Select Schools

The selection of Phase II comparison schools were identified in two ways: 1) schools that matched the HSFC schools on key demographic factors (e.g. school grades of 4th/5th grade, racial/ethnic percentage of student population, free/reduced lunch percentage of student population, similar academic letter grade, etc); and 2) they were chosen based on the willingness of the schools and their operators to allow themselves to be comparison schools for the intensive eight week data collection period and beyond. The Recovery School District in the Pilot Phase was able to provide three comparison schools (Banneker, Coghill and Schaumburg Elementary Schools.) Two of those schools later became charter schools no longer under RSD direct-control (Coghill and Schaumburg Elementary) leaving only one RSD school as a comparison school for Phase II. Given the extensive commitment involved in the data collection period, and the ever reducing number of RSD direct-run schools, the RSD only allowed for one school—Banneker—to be used as a comparison for Phase II. FirstLine Schools—interested in nutritional standards within their own schools volunteered their schools as a comparison group; however LPHI did identify that via their Edible School Yard (ESY) programming they had increased additional interventions to improve nutrition and nutritional education integration. Also, Firstline required higher nutritional standards of their chosen food vendor (Chartwells). FirstLine Schools therefore asked if two of their schools, one with the maximum programming (Arthur Ashe Charter School) and one with minimal to no ESY programming but with higher food standards (Dibert Community School) could be used. Utilizing these two schools, within the context of the study, allowed for secondary analysis to be built into the study to determine whether maximum nutritional integration programming through nutritional education and the ESY and raised food standards had any effect on consumption. This was seen as a way to a) provide the HSFC with additional information around future nutritional education programming they were wanting to develop in Phase III to combine with their contracting and food standard processes (i.e. determining whether this programming was successful in NOPS and therefore adapting it to HSFC schools in the future); as well as b) provide our FirstLine comparison schools with the analysis of whether their program showed any difference as the incentive to commit such time and resources to the study. Selecting these schools still gave us an adequate comparison group with no intervention to compare to the HSFC schools, but also allowed for additional analyses.

Figure 2. Phase II Design: School and Vendor Treatment Conditions



Green indicates HSFC membership.

Phase II, Evaluation Part I: Assessing Food Service Company Adherence

Part One of the Phase II evaluation assessed FMSC adherence, both on-site in schools and related to contractual obligations. This was assessed with two different mechanisms. First, the adherence of *served* school food was compared to the nutritional obligations set forth by the USDA. The evaluation also monitored the adherence of *served* school food to FSMC menus that are shared with school faculty parents.

To assess the nutritional content of lunches, a menu analysis was conducted. This protocol proved feasible during the Phase I pilot evaluation. Participating vendors provided menus with nutritional content of each meal on the dates of the data collection period (January 27, 2014 – April 4, 2014). The nutritional make-up of each lunch was then compared to the USDA nutritional standards and among vendors. The menu analysis was based on the planned lunch menus provided by each vendor.

Part One of the Phase II evaluation also closely monitored the fidelity of the FSMC school lunch menus in the school cafeterias. The fidelity monitoring tool was primarily used to give feedback to participating FSMCs about how their services are actually operating. The lead RA at each participating school completed the fidelity monitoring tool daily via a Qualtrics survey platform on a Nexus Asus 7 Tablet. The fidelity monitoring tool gathered information about whether or not the served food matched the published menu, the cleanliness of the food preparation area, the friendliness of the cafeteria staff, and several other items. The current study's fidelity monitoring tool was adapted from a similar survey developed in 2011 by the National Food Service Management Institute (NFSMI) of the University of Mississippi.[xxix] This tool was purely observational and did not include any interaction with school students or staff. All lead RAs were trained prior to data collection on how to reliably collect this data.

Phase II, Evaluation Part II: Assessing Student Consumption of School Lunch

Results from the Phase I pilot HSFC evaluation indicated that, on average, students were consuming no more than 300 calories per day. These findings were not generalizable, however, due to the short period of data collection (i.e., consumption data was only collected on one day at each school). To overcome this problem, the Phase II evaluation sent research teams to each school to collect data every day for eight weeks. Additionally, anecdotal experiences during the Phase I evaluation led to theories of the positive and/or negative effect that school policies (e.g. silent lunch) and cafeteria characteristics (e.g. cleanliness) may have on student consumption.

The plate waste study was conducted between January 27, 2014 and April 4, 2014. The plate waste methodology was executed every day of the school week (Monday-Friday) during the data collection period, except for holidays when the school was closed. Data collection teams collected consumption data during the 4th and 5th grade lunch period at each school on a daily basis. One on-site FSMC cafeteria employee assisted with daily data collection. This employee was trained in advance on standardizing lunch servings and how best to assist the research team during data collection. The on-site FSMC assisted RAs by prepping ten standard lunches at the beginning of each data collection day for measurement of pre-weights. Like the Phase I plate waste methodology, these sample weights constituted the average pre-lunch weight of the individual meal components.

As previously mentioned, the innovation of this project rests within the combination of the plate waste and menu analysis data. Held separately, the nutritional data and consumption data are not as interpretable, thus the two sets of data were combined to calculate the average of daily student consumption per school at the micro- and macro-nutrient level.

In order to better understand the complex relationship between school food offerings and rates of student consumption, the Environmental Scan Survey was collected twice during data collection. The survey collected data on school policies and cafeteria characteristics such as lighting, eating space, talking during lunch, and the presence of health promotion posters. The current study's Environmental Scan was adapted from similar surveys created by the Prevention Research Centers of Tulane University and Harvard University.

Phase II, Evaluation Part III: Assessing Student Satisfaction

Evaluation Part Three of the 2014 HSFC evaluation investigated student satisfaction with school food. As research shows that student satisfaction is positively correlated with consumption, all partners of the HSFC were interested in exploring this topic in participating schools. This part of the evaluation consisted of student satisfaction questionnaires and two focus groups. The Sterling Institutional Review Board based in Atlanta, Georgia waived the need for consent to administer the student satisfaction questionnaires. All participating students of the focus groups were consented.

The Student Satisfaction questionnaire was developed to be a brief, five-question survey that was completed by students at selected lunch periods. It is a quantitative survey and prompts responses on a Likert scale. This survey was adapted based on validated surveys from the field.[xxx] The survey has been designed at an appropriate reading level for 4th and 5th graders.

The surveys were administered to students once at the beginning of the data collection period and once at the end. Responses to the Student Satisfaction Questionnaire guided the direction of the focus groups, and responses were also included in Interim Reports sent out to participating FSMCs. At the end of the lunch period, the surveys were placed at 4th and 5th grade tables and students were given approximately five minutes to complete them. After all were completed, the research team collected the surveys and the students left the cafeteria. Qualitative focus groups were also conducted in June of 2014. Each school was given the opportunity for participation; however, time and resources allowed for the completion of only two focus groups. The purpose of the focus groups was to investigate student satisfaction of school food at a more in-depth and personal level than the brief student satisfaction surveys.

Phase II Sample Size

The sample sizes per school are described in Table 5. The total number of students per school is shared, as well as the total number of trays that were collected as a part of the Plate Waste methodology.

Table 5. Phase II Sample Sizes: Total Students and Trays Weighed per School

Membership	Food Vendor	School	# Students	% Trays Female	Total Trays Weighed
HSFC	Revolution Foods	Akili Academy of New Orleans (Crescent City Schools)	139	52%	3,359
HSFC	Revolution Foods	Schaumburg Elementary (RENew Schools)	183	45%	1,457
HSFC	Sodexo	Arise Academy (Arise Academy Charter)	124	54%	2,913
HSFC	Sodexo	KIPP Central City (KIPP New Orleans Schools)	111	49%	3,406
HSFC	Chartwells	Mary D. Coghill Elementary School (Better Choice Foundation, Inc.)	135	38%	2,455
Non-HSFC	Chartwells	Arthur Ashe Charter School (FirstLine Schools)	148	44%	2,530
Non-HSFC	Chartwells	Benjamin Banneker Elementary School (Louisiana Recovery School District)	83	53%	1,998
Non-HSFC	Chartwells	John Dibert Community School (FirstLine Schools)	113	43%	2,407

Data Collection Tools

The Phase II HSFC Evaluation included more measurement tools than the Phase I pilot. Whereas the Phase I pilot only included the plate waste and menu analysis methodologies, the Phase II evaluation added the following measures:

1. Fidelity Monitoring Tool
2. Student Satisfaction Surveys
3. Student Satisfaction Focus Groups
4. Cafeteria Environmental Scan

Table 6. Purpose of Additions to Phase II Evaluation Plan

These tools were added in order to address several of the limitations revealed by the Phase I pilot. The justification for the addition of these tools is explained below in Table 6.

Limitation of the 2013 Phase I Pilot	Evaluation Objective in Phase II (Designed to address limitation)	Measurement Tool
Because plate waste data was only collected on one day at each school, findings were not generalizable.	Measure daily student consumption of school lunch five days per week for eight weeks.	(Expanded) Plate Waste Methodology
Anecdotal experience during the Phase I pilot revealed the effect that school culture has on individual consumption patterns at each school.	Collect observational data on lunchtime characteristics, such as school policies and cafeteria environmental factors that may influence rates of consumption.	Cafeteria Environmental Scan
Student satisfaction with school meals may be the driving factor behind consumption. This was not assessed during the Phase I pilot. Research reveals that increasing student satisfaction with school food also increases food consumption.	Evaluate student satisfaction of school lunch, with particular attention to differences between HSFC-SFA schools and non-HSFC-SFA schools.	Student Satisfaction Survey Focus Groups
An additional part of evaluating the success of the HSFC program is the monitoring of food vendor partners. The Phase I menu analysis measured adherence to USDA standards, however did not address the daily operations on-site at schools.	Investigate adherence to contractual and federal requirements.	Fidelity Monitoring Tool Menu Analysis

Phase II Results

As stated above, three vendors were included in the Phase II evaluation. Revolution Foods, Sodexo, and Chartwells serviced schools (two each) that were members of the HSFC. Chartwells was the third vendor and was unique in that they serviced one school that was an HSFC member, and three schools that were not HSFC members. Because of this difference, in the analysis comparing vendors, for Chartwells only the three non-HSFC schools are included.

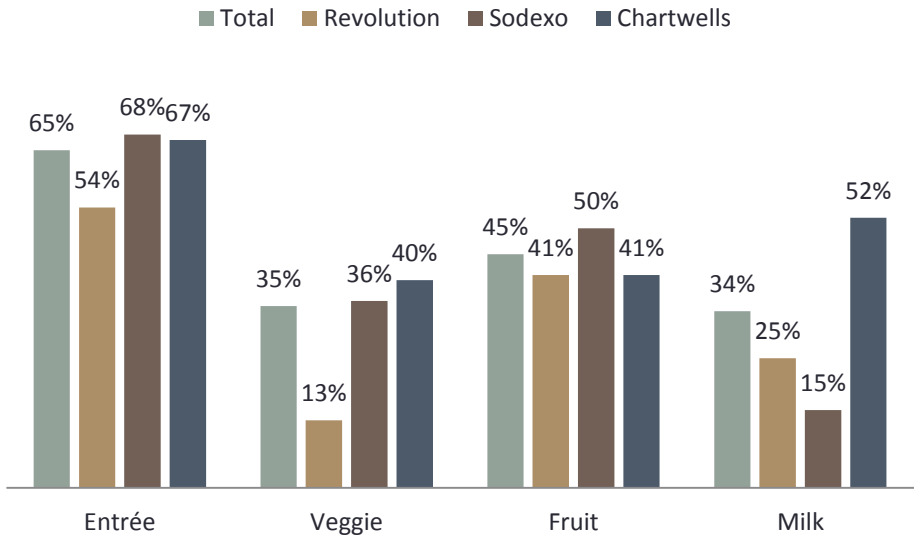
Consumption rates were determined by calculating a percentage based on the standardized pre-weight for each item and the individual post-weights for each tray. If a student did not select an entrée, vegetable, fruit, or milk, then that tray received a zero for that category to reflect zero consumption.

Plate Waste

As shown in Figure 3 and similar to Phase I, overall consumption was lower than recommended by the American Heart Association and USDA. The highest consumption rates were for the entrees across all vendors. This was followed by fruit consumption, which was between 40-50% across vendors. Two of the vendors had above 35% vegetable consumption, but students at the Revolution schools only ate 13%

of their vegetables. The high milk consumption at the Chartwells schools, relative to the other vendors, was likely because chocolate milk was offered.

Figure 3. Phase II Results: Percent Consumption of Lunch Food Items by Vendor



Menu Analysis

ANOVA was used to examine nutritional content of lunches (Table 7). Analysis focused on Kcals, sodium, total fat, and saturated fat to assess whether lunch menus met the nutritional standards put forth by the USDA and to explore how vendors compared to one another. Vendors provided weighted averages for daily menus that included the nutritional content used in this analysis.

For most analyses, the vendors met USDA standards for school lunch provision. The one exception was that the average reported Kcals per meal for the non-HSFC vendor was higher than the USDA recommended amount. The amount of sodium was lowest at Revolution, one of the HSFC vendors. The amount of total and saturated fat was highest at Sodexo, the other HSFC vendor.

Table 7. Phase II Results: Menu Analysis Results

Table 7		Vendor	Mean	p-value	Result	Federal requirements
Nutrient	Kcal	Revolution	551	0.0130	Significant difference between vendors [b]	550-650 kcal
		Sodexo	639			
		Chartwells	712			
	Sodium (mg)	Revolution	753	0.0000	Significant difference between vendors [a b]	1230 mg
		Sodexo	947			
		Chartwells	1033			
	Total fat (g)	Revolution	15.7	0.0000	Significant difference for total fat [a c]	< 30 % of Energy
		% of Energy	25 %			
		Sodexo	21.0			
		% of Energy	29 %			
		Chartwells	16.7		Significant difference for % of energy [b]	
		% of Energy	24 %			
	Saturated fat (g)	Revolution	4.7	0.0030	Significant difference for saturated fat [ac]	< 10 % of Energy
		% of Energy	8 %			
		Sodexo	6.3			
		% of Energy	9 %			
		Chartwells	5.1		Significant difference for % of energy [c]	
		% of Energy	7 %			

Vendor effects tested with ANOVA. Post-hoc paiwise comparisons were used to determine vendor differences. Pairwise comparisons with p<.05 indicated with letters.

a Difference between Revolution and Sodexo
b Difference between Revolution and Chartwells
c Difference between Sodexo and Chartwells

The average amount of nutritional content consumed with each tray is displayed in Table 8. Similar to the consumption results which indicate students are consuming half or less of their lunches, the amount of Kcals consumed at all schools is about half of what is recommended by the USDA for lunch with the highest amount of Kcals consumed at Chartwells schools.

Table 8. Phase II Results: Combining the Plate Waste and Menu Analysis Results

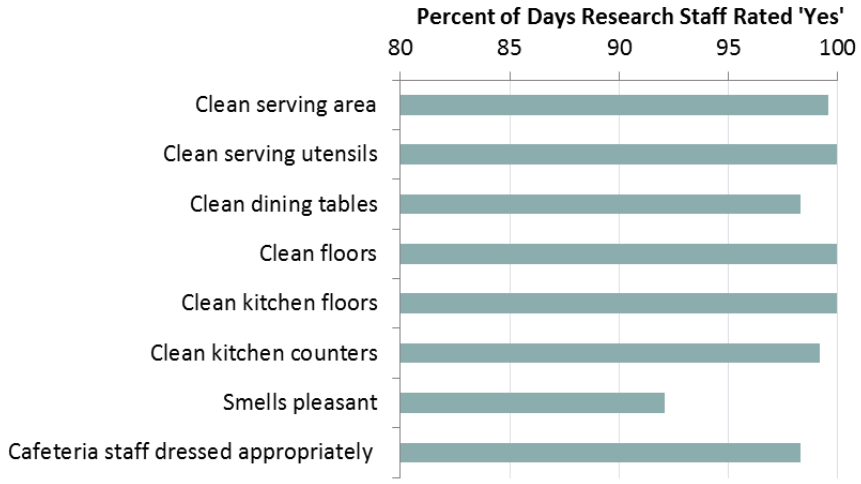
Table 8		Revolution	Sodexo	Chartwells
Nutrient	Kcal	234 kcal	304 kcal	355 kcal
	Sodium	307 mg	439 mg	566 mg
	Total Fat	6.7 g	10.2 g	9.6 g
	Saturated Fat	2.2 g	3.3 g	3.0 g

All bivariate comparisons between vendors across nutrient categories significant at p<.05.

Cafeteria Characteristics and Fidelity Monitoring

Cleanliness. Research staff rated the cafeterias on cleanliness during each day of data collection in each school. As shown in Figure 4, the cafeterias were rated as very clean, receiving a 'Yes' for cleanliness on more than 90% of days in each category.

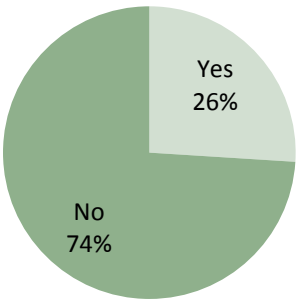
Figure 4. Percent of days cafeterias rated as clean across all schools



Effect of cafeteria characteristics and school policies on consumption.

The school lunch menus were posted on 26% of the days of data collection. However, consumption of calories during lunch did not differ based on whether the menu was posted.

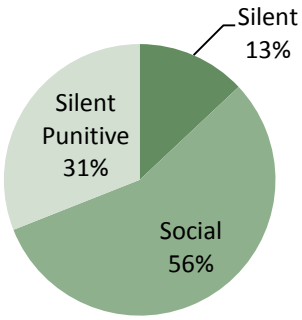
Is the menu posted?



Menu posted	Total kcals
Yes	310
No	312

The lunch periods were silent (talking not allowed) on 13% of days, and social (talking was allowed) on 56% of days. On 31% of days, lunches were silent punitive, meaning that the lunch policy allowed students to talk, but a silent period was imposed for at least two minutes of the lunch period as a disciplinary measure. Consumption results demonstrate that students consumed the most calories when they had social lunches and the least when they had silent lunches.

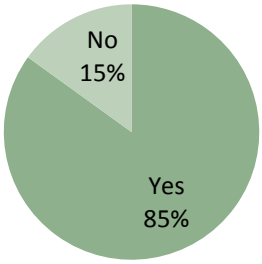
Social Lunch Policy



Social lunch policy	Total kcals
Social	337
Silent Punitive	289
Silent	256

On 15% of days recess did not occur as planned. In most cases this was because of weather, behavior problems, or testing. On those days, students consumed about 10% more calories compared to days when recess occurred as planned.

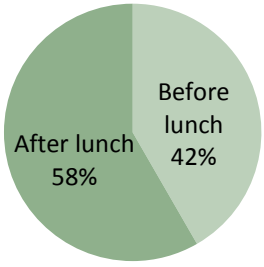
Did recess occur as planned?



Recess as planned	Total kcals
Yes	290
No	323

The timing of lunch for 4th and 5th graders was noted for each school. Research assistants at one school did not have information on the timing of recess. For the remaining schools, five had recess before the lunch period, and seven had recess following lunch. Student consumption of calories was highest (about 9% more) when recess occurred before the lunch period.

When did recess occur?



Recess timing	Total kcals
Before	310
After	283

Daily Menu Adherence

Adherence to published menus was assessed at each school on each data collection day. Researchers rated whether the food served matched what was provided on the posted menu. A complete match (e.g., if two vegetables were served, but had to match) was required to be scored as a match. Often menus indicated that selections were 'seasonal', thus, any item provided might be considered an adherence. Those cases are noted below. Table 9 shows the percent of days that selections matched the published menus. (Note that percentages may not add to 100% due to rounding). Menu adherence was much higher at HSFC schools, with entrée and vegetable selections matching around 75% of days, compared to considerably less than 50% of the time at non-HSFC schools. The fruit selections matched the posted close to 50% of days at HSFC schools, and only 11% of the time at non-HSFC schools. The non-HSFC schools often posted 'seasonal' selections on their menus for vegetables and fruits.

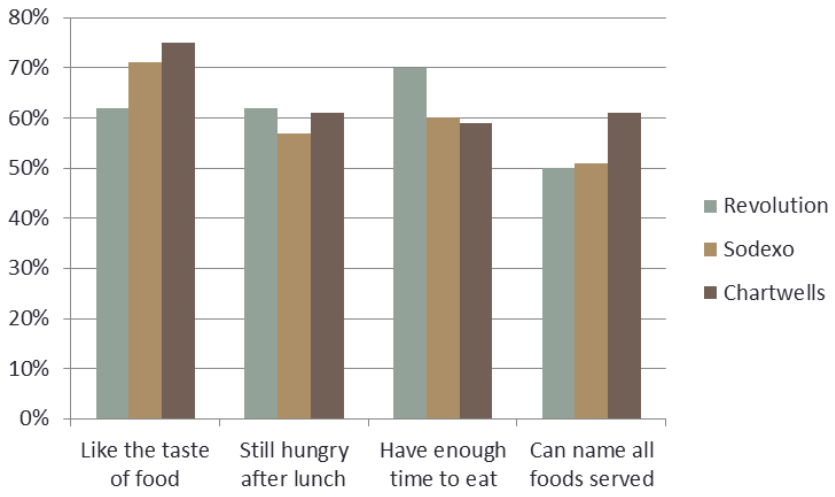
Table 9 **Daily Menu Adherence: Percent of Days**

Schools	Menu Status	Entrée	Veggie	Fruit
HSFC	Match	76%	75%	49%
	Non-Match	17%	18%	2%
	Seasonal	1%	1%	41%
	Missing	7%	7%	8%
Non-HSFC	Match	43%	37%	11%
	Non-Match	52%	35%	2%
	Seasonal	NA	23%	82%
	Missing	6%	6%	6%

Student Satisfaction

Students at each school completed the student satisfaction survey twice during the data collection period. Figure 5 displays how often students agreed with questions about satisfaction with their school lunch. A majority of students at schools serviced by each vendor reported liking the taste of their lunches. However, more than half of students reported still being hungry after the lunch period. The fact that many students are not getting full at lunch may be related to their perception that the lunch period is not long enough, as more than half of students said they do not have enough time to eat their lunch. Also, about half of students reported that they cannot name all of the foods served for lunch.

Figure 5. Student Satisfaction with School Lunch



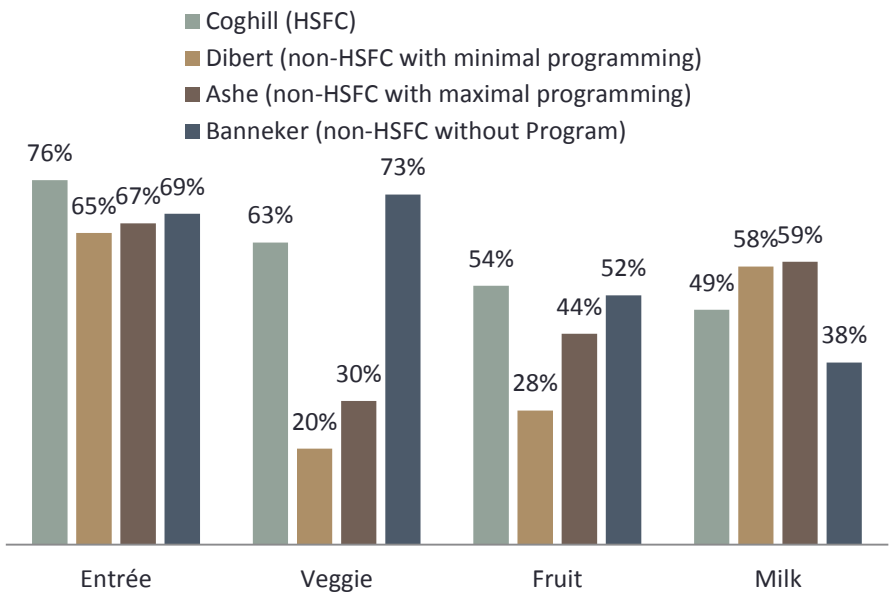
Focus Groups

Sixteen fourth grade students participated in focus groups at two of the HSFC schools. Of their school lunch options, students reported liking, barbeque chicken, pizza, chicken nuggets, hot dogs, and fresh fruit the best. These self-reported results are consistent with consumption data collected from the lunch trays. When students were asked what keeps them from eating their lunch, responses included a lack of time to eat and a preference for talking during lunch. Students also said that not knowing what they were eating was a reason for not consuming their lunches. Since about half of students reported being unable to name all the foods served on the student satisfaction survey, increasing awareness of the foods served may lead to increased consumption. Students also expressed that it is unfair that teachers get to eat snacks and fast food for lunch while they do not. Thus, it is possible that food policies for teachers may impact student ideas of nutrition, lifestyle, and wellness.

Consumption and School Programming

As noted above, Chartwells serviced one school that was part of the HSFC (Coghill) and three schools that were not part of the HSFC. Of the non-HSFC schools, Ashe had maximum nutrition and nutritional education programming through Edible School Yard (ESY), and Dibert had minimal to no ESY programming but shared the same increased food standards as Ashe. Banneker did not have any food-related programming. Consumption rates among these four schools with the same vendor are shown in Figure 6. Analysis revealed Coghill, the HSFC school, had the highest entree consumption. Vegetable consumption was highest at Coghill and Banneker, at more than 60%. Inspection of the data revealed that these high values were partially driven by the larger number of students selecting more than one vegetable for lunch (leading to the possibility of greater than 100% consumption among those students), and more potato and bean options (which tended to have higher consumption rates), compared to the other two Chartwells schools. Fruit consumption ranged from 44-54% among three of the schools. A larger proportion of students who did not select a fruit contributed to the lower fruit consumption at Dibert. It should be noted that the milk consumption among Coghill, the HSFC school, was much higher than that of the other HSFC schools with Revolution and Sodexo vendors. This may be due in part to the fact that Coghill offered chocolate milk; whereas, the other HSFC schools did not.

Figure 6. Phase II Results: Percent Consumption by Chartwell's Schools



Phase II Findings and Implications

All of the school cafeterias were rated as clean on almost all days by the research staff, and most students said they liked the taste of the food provided at lunch. Similar to Phase I findings from the pilot evaluation, Phase II findings showed low consumption among students at all schools. Moreover, students at HSFC schools are consuming less food on average than those at non-HSFC schools. Further analyses examining the potential influence of presence of nutritional education programming at two of the comparison non-HSFC schools revealed that with the exception of milk consumption, schools that have some other programming (Ashe and Dibert) consumed less than the HSFC school (Coghill). However, vegetable consumption at the non-HSFC school (Banneker) without any programming was still higher than vegetable consumption at the HSFC school, and fruit consumption at the Chartwells' HSFC school and non-HSFC school without additional nutrition programming was about the same. Thus, additional programming did not seem to influence greater consumption at the non-HSFC schools overall. This difference may be more likely attributable to food served by particular vendors.

When students' consumption was examined alongside nutrient analysis, analysis findings revealed that students at the non-HSFC schools consumed more Kcals than students at HSFC schools, but consistent with consumption findings, the amount of Kcals consumed was less than half of USDA recommendations. Although consumption was lower than recommended by the USDA at the HSFC schools, these consumption rates were comparable to (and in some cases greater than) consumption rates seen in public elementary schools with similar demographic characteristics. For example, one study found in their evaluation of a setting-level intervention designed to increase consumption of fruits and vegetables among low-socioeconomic status elementary and middle school students participating in the National School Lunch Program using a plate waste methodology that students consumed 46% of their fruit serving on average before the intervention and increased their fruit

consumption by 15% during the intervention.[xxxi] Fruit consumption rates at HSFC schools were between 40% and 50%. The study also found that vegetable consumption among their student sample was 19% on average pre-intervention and increased by 16% during the intervention.[xxxii] Average vegetable consumption at HSFC schools was 13% at Revolution schools and 35% at Sodexo schools.

Phase II findings also revealed that cafeteria environmental characteristics and school policies were associated with overall caloric intake during lunch. Specifically, students consumed more calories when they were able to talk during lunch, compared to when they were required to be silent. In addition they consumed close to 10% more calories when recess occurred before lunch, as opposed to after. Students also ate more calories when recess did not occur as planned. Perhaps the change in recess plans on those days resulted in a longer lunch period, but this will need to be investigated in a future study. Findings revealed that student caloric intake did not differ based on whether the lunch menu was posted or not. However, surveys and focus groups revealed students often did not know what they were being served and students in the focus group said that affected their consumption, so perhaps labeling each of the food items would increase acceptance of the lunch options.

Various factors beyond just the availability of certain foods and beverages appear to influence what students consume at school, and therefore, it is important to conduct research evaluating actual levels of consumption in order to better inform policies related to school nutrition. Research indicates that some of the main factors that may influence waste in school lunch programs include: serve only service or offer versus serve service[xxxiii], scheduling recess period before or after lunch[xxxiv], the length of the lunch period[xxxv], the presence of vending machines on campus, purchasing of competitive foods with lunch, food preparation method[xxxvi], student satisfaction, and food preference (all influenced by diversity of food choices, sufficient space at the table, hygiene of the eating atmosphere, food attractiveness, variety of food offered, friendliness of the lunch staff).[xxxvii]

Phase II evaluation findings revealed that school lunchtime policies did indeed influence student consumption. Consumption results demonstrated that students ate considerably more when they had social lunches and ate the least when they had silent lunches. This finding suggests that lunchtime policies that allow students to be social are conducive to student consumption; whereas, school policies that do not allow students to talk during lunch are associated with less consumption. This finding suggests a need for schools to review lunchtime polices in light of how they may affect student consumption of nutritious lunches. More research is needed in order to investigate the effect of school policies and environmental characteristics that may lead to increased food consumption. This type of research could point to cost-effective strategies for improving student consumption of school food.

Existing literature has demonstrated that multi-component school-based programs can increase fruit and vegetable consumption among children. A randomized school-based trial sought to increase fruit and vegetable consumption among children using a multi-component approach.[xxxviii] The intervention, conducted in 20 elementary schools in St. Paul, targeted a multiethnic group of children who were in the fourth grade in spring 1995 and the fifth grade in fall 1995. The intervention consisted of behavioral curricula in classrooms, parental involvement, school food service changes, and industry support and involvement. Lunchroom observations and 24-hour food recalls measured food consumption. Parent telephone surveys and a health behavior questionnaire measured psychosocial factors. The intervention increased lunchtime fruit consumption and combined fruit and vegetable consumption, lunchtime vegetable consumption among girls, and daily fruit consumption as well as the

proportion of total daily calories attributable to fruits and vegetables (Perry, et al., 1998). Thus, multi-component interventions could prove promising for increasing consumption in HSFC schools.

Conclusions

The evaluation aim of this study was to determine whether having a new SFA controlled by individual schools with raised nutritional standards and accountability could play a role in eliminating the obesity epidemic and improve the health of participating students. Thus, the first phase of the study was to establish a baseline. An additional goal was to provide valuable evidence to inform policy change related to larger school food administration practices. Initially, it was assumed that having a new SFA controlled by individual schools or a local lead school that can autonomously choose nutritious vendor options would:

- Improve the healthfulness of school meals
- Increase overall school food nutritional guidelines being met
- Increase student utilization of school meals – breakfast, lunch, snack, and supper
- Improve student's healthy and nutritious food options
- Affect student behavior towards healthier choices
- Ultimately play a role in decreasing obesity rates through the provision of healthier foods options provided to New Orleans Public School students

Importantly, with the design of the study being a post-intervention only examination of how nutritional standards affect consumption, longitudinal investigations must be conducted over time to assess the efficacy of the role of those standards in improved or increased healthfulness of school meals and student consumption of healthier food option will be done in order to determine these outcomes.

Most importantly, the results demonstrated that all food vendors met the increased Healthy Hunger Free Kids Act USDA nutritional guidelines (with one exception mentioned above). However, menu analyses indicated:

- Significant differences in Kcal content by vendor during Phase I and II (see Tables 2 and 7 in full report)
- Significant differences in sodium content during Phase I and II (Tables 2 and 7); Revolution had the least sodium compared to other vendors
- Significant differences in total fat content between Revolution Foods and the other two vendors in Phase I and the highest total and saturated fat content with Sodexo in Phase II (Tables 2 and 7)

It was demonstrated that both Phase I and Phase II HSFC school food vendors and comparison vendors all served meals that met the new USDA nutrition standards. However, whether food vendors met the HSFC nutrition standards was not determined through the Phase I or Phase II evaluation. In order to more specifically address this question, it is recommended for Phase III that the HSFC clarify how it interprets whether a food vendor is adhering to standards, so this criteria can be measured.

The third HSFC hypothesis was that participating in the HSFC vendor selection process would increase student utilization of school meals including breakfast, lunch, snack, and supper. While the baseline data alone was not able to determine an increase of student utilization, both Phase I and Phase II evaluation results demonstrated that lower than recommended consumption of school lunch foods is a problem that should be addressed by the HSFC going forward. Although the evaluation did not look at breakfast or supper programs, lower than recommended consumption of lunch foods was strongly documented. Clearly, student health is tied to consuming healthy foods, so increasing consumption of healthy foods must be a critical goal of future HSFC activities of the HSFC.

The fourth hypothesis was that HSFC selected vendors would increase (or improve) students' healthy and nutritious food options. This goal can only be assessed with additional data collections in Phase III of the study. This goal is similar to the first goal, but would require the HSCF to identify specific strategies for identifying more nutritious options for member schools, and continue to monitor compliance with those strategies.

The evaluation did provide future directions to address the fifth goal of affecting student behavior towards healthier choices. Plate waste data indicated low consumption of vegetables (35% on average) and fruit (45% on average). Clearly, more effective strategies are needed to increase consumption. Increasing consumption of vegetables is an area where the HSFC will have to examine best practices in other school communities.

The long-term goal of impacting obesity is not lost within the details of the HSFC Phase I and Phase II evaluations. The fact remains that addressing obesity is a *long-term* goal, and there are many incremental steps. Ensuring that schools provide healthy food options *and* that students are consuming those foods is a beginning and not an unimportant step to impacting the obesity problem.

In sum, Phase I and Phase II evaluations did reveal that school food nutritional guidelines were being met by both HSFC and non-HSFC schools in that the nutritional content of lunches being served at all schools met USDA requirements. However, further evaluation is needed to examine compliance with specific HSFC standards to determine if adherence to the increased standards—rather than HSFC membership alone—affects the healthfulness of school meals and improves students' healthy and nutritious food options. Although the evaluation phases did not examine directly whether HSFC food nutrition protocols affected student behavior towards healthier choices, the Phase II evaluation did reveal that students eating lunches provided by the vendor with the lowest kcals and sodium consumed the least amount of food. Future HSFC programming and evaluation will address evaluation goals not met by the Phase I or Phase II evaluations and will expand upon findings from Phase II.

Appendix

Phase II HSFC School Food Standards

USDA Cups/oz/grams per week (min per day)	**USDA K-5 Standards** **July 2012**	**HSFC Standards** **February 2014**
Fruits 2.5 (0.5)	1) Fresh, frozen without added sugar, canned in juice/light syrup, or dried fruit options 2) No more than half the offerings may be in the form of juice 3) 100% juice only 4) 1/4 cup dried fruit= 1/2 cup fruit 5) Fruit/vegetable separated into two components	1) Fresh or frozen (no additives) fruits must be served at every lunch, no canned fruits allowed 2) No juice can be served at lunch 3) Daily serving reflects variety over the week
Vegetables 3.75 (0.75)	6) Daily serving that reflects variety over the week 7) Fresh, frozen, and canned products **Dark green** 0.5 **Red/Orange** 0.75 **Starchy** 0.5 **Other** 0.5 **Additional Vegetable** 1.0 **Legumes** 0.5 (Can also be credited as a meat alternative)	4) Fresh or frozen (no additives) vegetables must be served at every lunch, no canned vegetables allowed 5) A daily vegetarian entrée option must be provided if the entrée is not vegetarian
Grains 8-9 oz (1)	8) Schools must offer the daily and weekly serving ranges of grains (min and max) 9) All grains offered must be whole grain-rich (SY 2014-15) *"Whole grain-rich"= must be at least 50 percent whole grains* 10) Only 2 creditable grain-based desserts allowed a week 11) Grains should meet at least one of the following: -Whole grains per serving must be ≥ 8g (IOM) -Must have FDA's whole grain health claim on packaging -Whole grain must be first in product ingredient list	6) All grains served must meet both of the following: -Whole grains per serving must be ≥ 8g (IOM) -Whole grain must be first in product ingredient list
Meats/Meat Alts 8-10 oz (1)	12) A variety of meat/meat alternates is encouraged 13) Tofu and soy yogurt will be allowable as meat alternate	7) No mechanically separated meat 8) No animal by-products

Cheese	No standard	10) No serving of processed cheese with additives and fillers (e.g. American cheese)
Fluid milk 5 (1)	14) Allowable options: fat-free (unflavored/flavored), low-fat (unflavored), fat-free or low-fat (lactose-reduced/lactose-free) 15) Must offer at least two choices	11) All milk served must be rBST or rGBH free (artificial growth hormone free) as declared by manufacturer
Saturated fat	16) <10 percent of total calories 17) No total fat standard	
Trans fat 0 g	18) 0 grams =less than 0.5 g per serving 19) Naturally occurring trans fat excluded (e.g. beef, lamb, dairy products)	12) No artificial trans fats or hydrogenated oils in ingredient lists
Calories	20) 550-650 (min-max kcal)	
Sodium	21) Current standard: ≤ 1230 mg 22) 2022-23 standard: ≤ 640 mg	
Sugar	No standard	13) Only products with little added and natural sugar are allowed 14) No foods with High Fructose Corn Syrup in the ingredient list are allowed
Cooking Method	No standard	15) No deep frying 16) Fresh, less processed food preparation methods are encouraged
Water	No standard	17) Water is provided daily as a beverage option
Competitive Foods	No standard	18) No competitive foods can be sold in the cafeteria or on school premises
Food Procurement	No standard	19) 5 percent of the HSFC's "spend" will be used for local food products

- The USDA adopts science-based nutrition standards for all foods and beverages served and sold in schools (RWJF and Pew Charitable Trust, 2012)
- Propeller's standards are in addition to the already mandated USDA standards (2012)

Endnotes

[i] Trust for America's Health (2010, November). *F as in fat. How obesity threatens America's future.* Retrieved from http://healthyamericans.org/reports/obesity2010/

[ii] Pennington Biomedical Research Center (2013, October). Reducing childhood obesity in Louisiana: An evidence-based approach to inform policy decisions. Retrieved from http://www.pbrc.edu/prism/.

[iii] Louisiana Office of Public Health Adolescent School Health Program (2010, August). *School-based health centers 2008-2009 annual services report*. Retrieved from http://dhh.louisiana.gov/index.cfm/newsroom/detail/2094.

[iv] Rose, D., Bodor, N., Swalm, C., Rice, J., Farley, T., & Hutchinson, P. (2009). Deserts in New Orleans? Illustrations of urban food access and implications for policy. *Ann Arbor, MI: University of Michigan National Poverty Center/USDA Economic Research Service Research*.

[v] ibid.

[vi] Scott S. Cowen Institute for Public Education Initiatives (2010). *The State of Public Education: Five Years After Hurricane Katrin*a. New Orleans, LA: Tulane University.

[vii] Briefel, R. R., Crepinsek, M. K., Cabili, C., Wilson, A., & Gleason, P. M. (2009). School food environments and practices affect dietary behaviors of US public school children. *Journal of the American Dietetic Association*, *109*(2), S91-S107.

[viii] Scott S. Cowen Institute for Public Education Initiatives (2010). *The State of Public Education: Five Years After Hurricane Katrin*a. New Orleas, LA:Tulane University.

[ix] Robert Wood Johnson Foundation. The School Food Environment, Children's Diets, and Obesity: Findings from the Third School Nutrition Dietary Assessment Study. Journal of the American Dietetic Association. February 2009; 109(2):Supplement. 18 United States Department of Agriculture Center for Nutrition Policy and Promotion. Dietary Guidelines for Americans, 2010. Report of the Dietary Guidelines Advisory Committee. http://www.cnpp.usda.gov/DGAs2010-DGACReport.htm. Accessed June 26, 2010.

[x] The New Orleans Food Policy Advisory Committee (2010). Stepping up to the Plate: Transforming School Food in New Orleans. Retrieved from http://nolafoodpolicy.org/Transforming_School_Food_Web.pdf.

[xi] Schanzenbach, D. W. (2009). Do school lunches contribute to childhood obesity? *Journal of Human Resources*, *44*(3), 684-709.

[xii] Scott S. Cowen Institute for Public Education Initiatives (2007). *The State of Public Education: Two Years After Hurricane Katrin*a. New Orleas, LA:Tulane University.

[xiii] ibid.

[xiv] ibid.

[xiv]ibid.

[xv] Buzby, J. C., & Guthrie, J. F. (2002). *Plate waste in school nutrition programs: Final report to Congress*. Economic Research Service, US Department of Agriculture.
Goggans, M. H., Lambert, L., & Chang, Y. (2011). Offer versus Serve or Serve Only: Does Service Method Affect Elementary Children's Fruit and Vegetable Consumption?. *Journal of Child Nutrition & Management*, *35*(2), n2.

[xviii] Bergman, E. A., Buergel, N. S., Englund, T. F., & Femrite, A. (2004). The relationship between the length of the lunch period and nutrient consumption in the elementary school lunch setting. *J Child Nut Mgmt [serial online]*.
Tanaka, C., Richards, K. L., Takeuchi, L. S., Otani, M., & Maddock, J. (2005). Modifying the recess before lunch program: a pilot study in Kaneohe elementary school. *California J Health Promot*, *3*(4), 1-7.

[xix] Conklin, M. T., Lambert, L. G., & Anderson, J. B. (2002). How long does it take students to eat lunch? A summary of three studies. *J Child Nutr Manag*, *26*(1).

[xx] Marlette, M. A., Templeton, S. B., & Panemangalore, M. (2005). Food type, food preparation, and competitive food purchases impact school lunch plate waste by sixth-grade students. *Journal of the American Dietetic Association*,*105*(11), 1779-1782.

[xxi] Meyer, M. K., & Conklin, M. (1998). Variables affecting high school students' perceptions of school foodservice. *Journal of the American Dietetic Association*, *98*(12), 1424-1431.

[xxii] American Heart Association (2011). *Understanding childhood obesity*. Retrieved from https://www.heart.org/idc/groups/heart-public/@wcm/@fc/documents/downloadable/ucm_428180.pdf.

[xxiii] United States Food and Drug Administration (2012, January). Nutrition Standards in the National School Lunch and School Breakfast Programs. Retrieved from http://www.fns.usda.gov/sites/default/files/dietaryspecs.pdf.

[xxiv] Kleinman, R. E., Hall, S., Green, H., Korzec-Ramirez, D., Patton, K., Pagano, M. E., & Murphy, J. M. (2002). Diet, breakfast, and academic performance in children. *Annals of Nutrition & Metabolism*, *46*(0 1), 24.

[xxv] Jung, J., Lee, Y., & Oh, Y. J. (2009). Comparison of student's satisfaction on school food service environment by the eating place and gender. *Nutrition research and practice*, *3*(4), 295-299.

[xxvi] Meyer, M. K., & Conklin, M. (1998). Variables affecting high school students' perceptions of school foodservice. *Journal of the American Dietetic Association*, *98*(12), 1424-1431.

[xxvii] Townsend, N., & Foster, C. (2013). Developing and applying a socio-ecological model to the promotion of healthy eating in the school. *Public health nutrition*, *16*(06), 1101-1108.

[xxviii] Minnerath, K.L. (2009). Nutrition education: An analysis of the effects of a multi-level, school-based intervention on elementary school children. Dissertation Abstracts International Section A: Humanities and Social Sciences, 6(11-A), 4255.

[xxix] National Food Service Management Institute, 2011

[xxx] The Network for a Healthy California Research and Evaluation Unit, 2011

[xxxi] Hakim, S. M., & Meissen, G. (2013). Increasing consumption of fruits and vegetables in the school cafeteria: the influence of active choice. *Journal of health care for the poor and underserved*, *24*(2), 145-157.

[xxxii] ibid.

[xxxiii] Buzby, J. C., & Guthrie, J. F. (2002). *Plate waste in school nutrition programs: Final report to Congress*. Economic Research Service, US Department of Agriculture.
Goggans, M. H., Lambert, L., & Chang, Y. (2011). Offer versus Serve or Serve Only: Does Service Method Affect Elementary Children's Fruit and Vegetable Consumption?. *Journal of Child Nutrition & Management*, *35*(2), n2.

[xxxiv] Bergman, E. A., Buergel, N. S., Englund, T. F., & Femrite, A. (2004). The relationship between the length of the lunch period and nutrient consumption in the elementary school lunch setting. *J Child Nut Mgmt [serial online]*.
Tanaka, C., Richards, K. L., Takeuchi, L. S., Otani, M., & Maddock, J. (2005). Modifying the recess before lunch program: a pilot study in Kaneohe elementary school. *California J Health Promot*, *3*(4), 1-7.

[xxxv] Conklin, M. T., Lambert, L. G., & Anderson, J. B. (2002). How long does it take students to eat lunch? A summary of three studies. *J Child Nutr Manag*, *26*(1).

[xxxvi] Marlette, M. A., Templeton, S. B., & Panemangalore, M. (2005). Food type, food preparation, and competitive food purchases impact school lunch plate waste by sixth-grade students. *Journal of the American Dietetic Association*,*105*(11), 1779-1782.

[xxxvii] Meyer, M. K., & Conklin, M. (1998). Variables affecting high school students' perceptions of school foodservice. *Journal of the American Dietetic Association*, *98*(12), 1424-1431.

[xxxviii] Perry, C. L., Bishop, D. B., Taylor, G., Murray, D. M., Mays, R. W., Dudovitz, B. S., Smyth, M. & Story, M. (1998). Changing fruit and vegetable consumption among children: the 5-a-Day Power Plus program in St. Paul, Minnesota. *American Journal of Public Health*, *88*(4), 603-609.