The Effect of Nutrition Training on the Nutrition Knowledge of School Nutrition Managers and Food Choices Made By Students in Public School Cafeterias

Martha Toner
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ABSTRACT

THE EFFECT OF NUTRITION TRAINING ON THE NUTRITION KNOWLEDGE OF SCHOOL NUTRITION MANAGERS AND FOOD CHOICES MADE BY STUDENTS IN PUBLIC SCHOOL CAFETERIAS

by

Marti Toner

Background: In 2012, more than one in three American youth were classified as overweight or obese. The cause of obesity is multifactorial. However, environmental influences and behavioral characteristics appear to have more impact on the development of obesity than genetics and/or cultural background. In response to an Institute of Medicine briefing detailing recommendations for changes to school meals, the Healthy, Hunger-Free Kids Act of 2010 was passed to update nutrition guidelines for schools participating in the National School Lunch and School Breakfast Programs. This Act seeks to help reduce childhood obesity through the provision of nutritionally balanced school meals.

Methods: We conducted a secondary analysis of data collected by Children’s Healthcare of Atlanta as part of its Strong4Life School Nutrition Program. School nutrition managers in a South Georgia school district participated in a dietitian-led training, inclusive of a pre- and post-training survey. Food production data including the number
of servings of foods prepared and sold in elementary schools in the same school district were also collected during the weeks preceding the manager training and post training. Observations of the cafeteria organization were also recorded pre and post training.

Frequency statistics were used to describe the pre- and post-survey and food production data. A Wilcoxon signed-rank test was used to compare pre- and post-survey scores. Cafeteria organizational changes were compared for improvement pre- and post-training.

**Results:** Of the 30 school nutrition managers who completed the pre- and post-surveys, 23 (77%) provided identifying information and were included in this analysis. The average pre- and post-survey scores were 4.9 and 5.8, respectively (18.4% increase). Twelve participants received a higher score after the training session, 10 had no change in score, and one participant’s score decreased following the training. The vast majority of managers (>90%) indicated that they would like to encourage changes in the cafeteria to promote healthy choices and that they felt confident in their abilities to provide guidance to cafeteria staff to make such changes. Manager perception of overweight and obesity in the state of Georgia being “very serious” or “somewhat serious” increased from 93% before the training to 100% following the training. Six of the 12 schools in which food production data was obtained showed improvement in the percentage of students who chose skim or 1% plain milk vs. flavored milk. Seven schools showed an improvement in the percentage of fruit sold between March and October, four showed an improvement in vegetables sold.

**Conclusions:** School nutrition managers showed increased nutrition knowledge and belief in their individual ability to act as a role model in the school cafeteria after completing a dietitian-led training session. No association was found between increased
nutrition knowledge of managers and changes in student food purchasing habits. Future iterations of this training program should include collection of the name of the school(s) in which the manager presides to determine association between increased nutrition knowledge and/or changed perception of role in promoting healthy habits and changes in student purchasing habits.
THE EFFECT OF NUTRITION TRAINING ON THE NUTRITION KNOWLEDGE OF SCHOOL NUTRITION MANAGERS AND FOOD CHOICES MADE BY STUDENTS IN PUBLIC SCHOOL CAFETERIAS

by

Marti Toner

A Thesis

Presented in Partial Fulfillment of Requirements for the Degree of Master of Science in Health Sciences

The Byrdine F. Lewis School of Nursing and Health Professions

Department of Nutrition

Georgia State University

Atlanta, GA
2015
ACKNOWLEDGMENTS

I am unbelievably grateful to Dr. Anita Nucci for her relentless patience and incomparable guidance throughout the compilation of this thesis. The amount of knowledge and insight that she possesses is unparalleled, and I consider myself incredibly fortunate to have had the opportunity to work with her. I also extend my sincerest thanks to Dr. Sarah Henes and Farrah Keong for their input and assistance during this process. And lastly, but certainly not least, I am forever thankful to my husband, Matt, for his enduring reassurance and unyielding faith in my capabilities as I ventured down this new career path. Without question, I would not have made it to this point without his love and support.
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<table>
<thead>
<tr>
<th>Abbreviation</th>
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<tr>
<td>AI</td>
<td>Adequate Intake</td>
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<td>BEN</td>
<td>Behavioral Economics in Child Nutrition Programs</td>
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<td>BMI</td>
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<td>CDC</td>
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<td>CHOA</td>
<td>Children’s Healthcare of Atlanta</td>
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<td>DRI</td>
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<td>EAR</td>
<td>Estimated Average Requirement</td>
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<td>HHFKA</td>
<td>Healthy, Hunger-Free Kids Act</td>
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<td>IOM</td>
<td>Institute of Medicine</td>
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<td>IOTF</td>
<td>International Obesity Task Force</td>
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<td>NIH</td>
<td>National Institutes of Health</td>
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<td>NSLP</td>
<td>National School Lunch Program</td>
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<td>RDA</td>
<td>Recommended Dietary Allowance</td>
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<td>SBP</td>
<td>School Breakfast Program</td>
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<td>US</td>
<td>United States</td>
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<tr>
<td>Acronym</td>
<td>Description</td>
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<tr>
<td>USDA</td>
<td>United States Department of Agriculture</td>
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<td>WPA</td>
<td>Works Progress Administration</td>
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CHAPTER I

THE EFFECT OF NUTRITION TRAINING ON THE NUTRITION KNOWLEDGE OF SCHOOL NUTRITION MANAGERS AND FOOD CHOICES MADE BY STUDENTS IN PUBLIC SCHOOL CAFETERIAS

Introduction

Obesity among American children is a national crisis. In 2012, one in three American youth, aged 2 to 19 years, was classified as overweight or obese; nearly 17% of these children were obese. While numerous policies and public health recommendations focused on nutrition and weight management have been implemented throughout the last several decades, the rate of overweight and obese has continued to increase. Obesity in childhood increases the risk for chronic conditions such as cardiovascular disease, type 2 diabetes, asthma, sleep apnea, joint problems, fatty liver disease, gallstones, in addition to both psychological and social problems later in life. In addition, individuals who are obese as children experience increased risk for obesity and its associated health risks (diabetes, heart disease, certain cancers) in adulthood.

The cause of the obesity epidemic is multifactorial; biological, behavioral, cultural, genetic, and/or environmental aspects all play a role in its development and progression. It is largely maintained that environmental influences and individual behaviors have the most significant influence as instances of overweight and obesity most commonly result from reduced physical activity, poor dietary habits, or a combination of these factors. Previous studies have shown that children who consume a diet higher in fruits and vegetables have lower rates of obesity. However, only 40% of American
children consume the recommended daily servings of fruit and only 7% intake the daily recommended amount of vegetables.\textsuperscript{13}

Over 30 million youth and adolescents in American elementary, middle, and high schools take part in the National School Lunch Program each day. In an effort to ensure the healthfulness of these meals, in 2009 the Institute of Medicine (IOM) recommended that the amount and variety of fruits and vegetables provided in school meals be increased and that milk be limited to no and low-fat varieties.\textsuperscript{14,15} In 2010, Congress passed the Healthy, Hunger-Free Kids Act (HHFKA) to formally implement these recommendations in a concerted effort to contest the pervasiveness of childhood obesity in the United States. This Act necessitates that all American schools participating in the National School Lunch Program meet specified food and nutrient requirements in all of its meals.\textsuperscript{16} However, these guidelines do not address the actuality of student choice to select, and subsequently consume, the nutritious offerings provided in school cafeterias. Desirable appearance, convenience, and familiarity with foods each influence selection.\textsuperscript{17} Simple encouragement or prompting has also been shown to generate increased selection of those foods that may be less familiar or typically enticing to a school-aged child.\textsuperscript{17,18} But, little is known about the role that school nutrition managers maintain in the decision making and purchasing habits of students in school cafeterias.\textsuperscript{19}

School nutrition managers, the individuals largely responsible for implementing the practices of the HHFKA, possess the ability to facilitate acceptance of these school meals designed to promote increased nutritious eating habits. The purpose of this descriptive study is to examine the relationship between school nutrition managers’ knowledge of and belief in the importance of proper nutrition for school children and the
food purchasing habits of their students. We hypothesize that after attending a nutrition-
expert led training session, school nutrition managers will demonstrate an increase in
nutrition knowledge, and subsequent belief in the importance of their role as nutrition
providers as compared to before the training. We also hypothesize that the number of
nutritious food and beverage selections by students will increase after the manager
training program and that we will observe changes to the food displays within the
cafeteria, highlighting the most nutrient-dense items. Our null hypotheses are as follows:
1) the nutrition knowledge score or belief in the significance of the role of the manager as
nutrition providers will be the same before and after the training session, 2) neither the
number of nutritious food and beverage items selected by students nor the food displays
within the cafeteria will differ before and after the manager training program.
CHAPTER II
Literature Review

History of School Meal Programs

When the Children’s Aid Society of New York implemented a program serving meals to its students in 1853, it was the first of its kind in the United States (US). While school meal service was provided in many European countries, it took several decades for cities in the US, outside of New York City, to implement food services for their students. However, during and after World War II, the need for adequate childhood nutrition garnered great attention as many young men were unable to participate in military services due to inadequate health status. Robert Hunter’s 1904 book Poverty instigated a stir among the American people of its obligation to feed the growing population of hungry children in its school systems. Hunter wrote “guidance and supervision of the parents are impossible because there are too many hungry mouths to feed; learning is difficult because hungry stomachs and languid bodies and thin blood are not able to feed the brain… If it is a matter of principle in democratic America that every child shall be given a certain amount of instruction, let us render it possible for them to receive it, as monarchial countries have done, by marking full and adequate provision for the physical needs of the children who come from the homes of poverty.”

At the time of Poverty’s publication, school lunch programs were in development in Philadelphia, Boston, and Milwaukee. The Starr Center Association in Philadelphia was offering lunches for a single penny in 9 schools across the city. In 1909 the operation of this school lunch program was transitioned to the Philadelphia School Board. The
orchestrator of this resettlement, Dr. Cheesman A. Herrick, required that the program be based upon appropriate nutrition principles. Within 3 years the program was successfully expanded to each high school within Philadelphia under the establishment of a newly created authority, the Department of High School Lunches. Shortly thereafter, the Department of High School Lunches authorized the extension of its offerings to the city’s elementary schools. In Boston, the first school feeding programs were implemented under the guidance of the Women’s Educational and Industrial Union, who utilized a centralized kitchen operation to transport hot lunches to participating high schools. By 1910, the program was also providing meals to local elementary schools through a collaboration with Home Economics students within the individual schools. Similarly, in 1904 in Milwaukee, the Women’s Alliance of Wisconsin, in tandem with donations from churches, societies, and individual citizens, began preparing lunches within the homes of women who lived nearest the city’s schools. The meals were then transported to and served at the schools. Within just a few years, improvement in student attendance was observed, and the food preparation was moved within the schools under the direction of an appointed matron. The meals were sold for one cent; however, those students who could not afford to pay received their lunches free of charge.

Throughout the first three decades of the 20th century, school feeding programs expanded across the US. By 1937, 15 states had passed laws authorizing its local school boards to conduct lunchroom service within its schools. Common practice at that time was to offer the meals to the students at a minimum cost that covered the food expenses, but no associated labor-related fees. Several states (Indiana, Missouri, Vermont, and Wisconsin) developed special offerings for those children who could not afford the meal
With the growth of these programs and ever increasing participation rates, the need for federal aid support commenced.

During the latter half of the 1930’s federal assistance under both the Civil Works Administration and the Federal Emergency Relief Administration was offered to 39 states across the country. As a result of the Great Depression, many families struggled to provide adequate rations for their family and did not have adequate finances to allow their children to purchase school lunch. In 1936, Public Law 320 set aside 30% of duties collected from annual customs laws for allocation by the Secretary of Agriculture to encourage consumption of surplus domestic agricultural products by restricting them from usual trade and commerce networks. The law’s intention was to remove the excess food products associated with reducing rates while utilizing the goods as part of specified government programs. This commodity allocation became the first purchase and distribution system between the United States federal government, via the United States Department of Agriculture (USDA), and local school systems. By the end of 1939, over 14,000 schools were procuring foods through the program, resulting in the feeding of almost 900,000 students.

The commodity donation program required great collaboration between federal, state, and local governments. Before a school board, mother’s club, or other civic/social organization coordinating a school lunch program could enroll to receive these surplus goods, the organization was mandated to sign an agreement with the state guaranteeing the following: 1) the commodities would only be used for school lunches prepared on-site; 2) commodities would not be sold; 3) the meal program would not be profit-seeking; and 4) that those students receiving free meals due to financial limitations would not be
segregated nor identified to their peers. Initially, each school was allotted its proportion of the goods based upon the number of underprivileged children participating in the program. This stipulation was quickly adjusted to represent the total number of participating students, notwithstanding financial status.27

While school lunch participation continued to expand, due largely to the commodity donation program, many programs struggled to reconcile funds associated with growing labor costs. The Reconstruction Finance Corporation, the Civil Works Administration, and the Federal Emergency Relief Administration all offered financial assistance for such labor costs until the mid-1930s. At that time, the Works Progress Administration (WPA), created to produce public projects based jobs for needy citizens, allocated a substantial portion of its operations to school lunch work. Supervisors, commonly with food service backgrounds, were identified at the State level. Each supervisor oversaw a team of district and local supervisors to in turn managed workers within the individual schools with the general day-to-day operations of producing school lunch. The state and district workers participated in development of menus and recipes, as well as training documents for general food safety mechanisms and standards. This allocation of labor to the WPA absolved the local school districts from much of the labor-associated costs with providing meal service to its students. Consequently, participation accelerated. By 1941, school lunch programs were in existence in all States, plus the District of Columbia and Puerto Rico.27

The school lunch program was temporarily discontinued during World War II. As the war continued, federal budgets were largely re-aligned to support the combat efforts and needs of the US Armed Forces and its allies. The WPA was terminated
entirely and the commodities donation program saw its surplus goods reallocated to the troops stationed abroad. In 1944, the operations associated with the national school lunch program had downgraded severely, from almost 93,000 schools providing meals to 6 million children each day, to just 34,000 schools serving 5 million participants. To prevent further decline, Congress passed Public Law 129, designating funds up to $60 million to sustain national school lunch programs during 1943 and 1944. The following year, this provision was expanded further, apportioning $50 million for school lunch programs. When Congress extended another $50 million for the 1945-46 school year, the nation saw participation rise to over 6.7 million children. It was during this time that the school lunch act, formally designated as the Richard B. Russell National School Lunch Act, was officially declared as national policy by Congress, stating “as a measure of national security, to safeguard the health and well-being of the Nation’s children and to encourage the domestic consumption of nutritious agricultural commodities and other food, by assisting the States, through grants-in-aid and other means, in providing an adequate supply of foods and other facilities for the establishment, maintenance, operation, and expansion of nonprofit school lunch programs.”

During the 1960’s, as persisting anxiety associated with annual appropriations for school lunch programs continued, Congress proposed legislation to formalize and dictate permanence to what is now known as the National School Lunch Program (NSLP). The House Committee on Agriculture reported that “the expansion of the program has been hampered by basic legislation…. The national school lunch bill provides basic, comprehensive legislation for aid, in general, to the States in the operation of school lunch programs as permanent and – integral parts of their school systems…. The
educational features of a properly chosen diet served at school should not be under-emphasized. Not only is the child taught what a good diet consists of, but his parents and family likewise are otherwise instructed.”

The act clearly dictated the manner in which the allocation of funds should be utilized. Included were food and equipment provisions, mandated meal nutritional requirements, and the stipulation that reduced or free of charge meals would be provided to those children who could not afford the affixed cost.

Over the years, the stipulations of the National School Lunch Act have been recurringly amended, and the governing body of the school lunch program has shifted. Throughout much of the 1960’s and 1970’s, the focus of these changes was concentrated on malnutrition prevalence amongst needy children attending American schools. During this time, many schools across the country also began offering breakfast to their students. The 91st Congress employed an amendment declaring consistent guidelines related to eligibility requirements for free and reduced-price school meals. This amendment also set a maximum charge for reduced-price breakfasts and lunches offered in elementary, middle, and high schools participating in the NSLP.

Nutrition Standards for School Meals

In the 1960s, national surveys began to collect anthropometric indices of American children. These surveys reported a steady body mass index (BMI) distribution until the 1980’s, after which time a consistent, pervasive increase began. One study supported by the National Institutes of Health (NIH) showed that from the 1970’s to the early 1990’s the prevalence of obesity (defined as a BMI of 30 or higher by the
International Obesity Task Force (IOTF)), increased from 0% to 14% in boys, and from 2% to 12% in girls.\textsuperscript{31–33} The Centers for Disease Control and Prevention has reported that rates of obesity among 2 to 19 year old children and adolescents, defined as $\geq$ the 95th percentile when plotted on the CDC BMI-for-age growth chart, increased from 5% in the early 1970’s to 10% in the late 1980’s. By 2008, 17% of American children were clinically categorized as obese.\textsuperscript{34} As a result, the primary focus of the school lunch program began to shift from providing sustenance to the nation’s undernourished children to combatting the public health epidemic of childhood obesity.

Following the Healthy Meals for Americans Act of 1994, the School Meals Initiative was created by the USDA to align school meals with the existing Dietary Guidelines for Americans (Appendix A). The Initiative implemented a menu-planning system to assist schools country-wide with the creation of healthful meals that incorporate the dietary guidelines, specifically limiting fat to 30% or less of total calories, and also appeal to children. By 2001, data collected via the School Nutrition and Dietary Assessment Survey found that schools were struggling to comply with these standards, as the average fat content in a school lunch still hovered at 35% of the daily recommendation of total caloric intake.\textsuperscript{35}

At the request of the USDA, in 2009 the Institute of Medicine (IOM) published the report \textit{School Meals: Building Blocks for Healthy Children} detailing its recommendations to update the existing school meal standards for the National School Lunch Program (NSLP) and the School Breakfast Program (SBP). This guidance included the creation of both a minimum and maximum caloric level, an increase in the required amount of fruits, vegetables, and whole grains, and the incorporation of an
overall reduction in sodium and saturated fat. Furthermore, the IOM report enforced the importance of designating nutrient targets and meal requirements that vary by age/grade (kindergarten through grade 5; grades 6 through 8; grades 9 through 12) and remain consistent with both the *Dietary Guidelines for Americans* and Dietary Reference Intakes (DRI).

Dietary Reference Intakes were initially created in 1995 as a solution to an established need for a comprehensive solution to provide nutrition-related guidance for the nation, as the existing Recommended Dietary Allowances (RDA) lacked differentiation between individuals and groups. The DRIs cover a set of four reference values: 1) RDAs detail the average daily dietary intake of nutrients that meet dietary requirements of 98% of healthy individuals; Adequate Intake (AI) is used when the RDA cannot be determined; Tolerable Upper Intake levels represent the highest amount of a nutrient that may be consumed with no risk of toxicity; and Estimated Average Requirements (EAR) are the amount projected to meet the daily requirement of half of all healthy individuals. Each of these values is customized by gender and for varying stages of life.

The *Dietary Guidelines for Americans* are a broader set of recommendations released every 5 years by the USDA and the Department of Health and Human Services. The most current version of the guidelines, termed the *Dietary Guidelines for Americans of 2010*, places emphasis on the consumption of more fruits, vegetables, whole grains, fat-free and/or low-fat dairy products and seafood and the reduction in sodium, saturated and trans-fats, cholesterol, refined grain products, and added sugars. While these general recommendations apply to the American population as a whole, several specific measures
were outlined for children. For example, the *Guidelines* encourage that total daily sodium intake for children should be reduced to just 1,200 mg for 4 to 8 year olds and 1,500 mg daily for older children. Additionally, the recommended macronutrient breakdown for school age children is 45-65% carbohydrate, 10-30% protein, and 25-35% fat.  

In December of 2010, with bipartisan Congressional support, the Healthy, Hunger-Free Kids Act (HHFKA) was passed, comprising many of the recommendations contained in the IOM’s *School Meals: Building Blocks for Healthy Children*’s report. In addition to its reauthorization of funding for federal school meal programs, the bill set specific guidelines focused on improved nutrition of the nation’s school children and reducing childhood overweight and obesity. Specifically, the bill provided the USDA with the authority to set nutrition-related standards for any food sold in schools participating in the National School Lunch Program. These new standards required that schools participating in the NSLP comply with the following parameters: offer fruits and vegetables as separate meal components; offer fruit every day at both breakfast and lunch; offer vegetables every day at lunch (and provide vegetable options that meet specific sub-group requirements each week – dark green, orange, legumes, and “other” – with a restricted number of servings of starchy vegetables); offer whole grains; offer a daily meat or meat alternate during breakfast; offer fat-free and low-fat milk; offer meals that meet described calorie ranges by age/grade group; reduce overall meal sodium content; eliminate trans-fat; require that students choose a fruit or vegetable; and adopt a single food-based menu planning style in accordance with determined age/grade groups.
Diets that consist of high quality foods including fruit, vegetables, whole grains, and plant-based/lean proteins have been linked to reduced all-cause mortality. Additionally, associations have been found between adequate fruit and vegetable intake and successful weight management. Between the ages of 5 and 18 years, American children spend nearly half of their days in school. Therefore, it is justifiable to more closely examine school meal offerings and student food selection. In 2007, researchers who conducted a study of interventions related to food exposures to children reported that food preference and intake of children is affected by the child’s personal experiences with specific foods and that the earlier in life and broader range of foods to which a child is exposed, the healthier the child’s diet. Additionally, repeated exposures to less familiar foods contributed to both increased consumption and liking of those items.

School Meal Acceptance

Following the passage of the Healthy, Hunger-Free Kids Act, claims of increased food waste and its resulting additional financial burden, and a general resounding disdain for the revised meals became commonplace in the media and from food industry representatives. However, a recent study published by the Robert Wood Johnson Foundation showed that by the spring of the 2012-2013 school year, administrators in US public elementary, middle, and high schools indicated that the majority of students actually expressed some level of enjoyment for the new school meals. Cohen et al. (2014) pointed out that significant plate waste has long been a problem in public school cafeterias; but interestingly, a reduction in waste was found post-implementation of the HHFKKA. The study of over 1,000 students across 8 elementary schools reported that
despite the requirements to serve larger portions of and more variety of fruits and vegetables and provide at least 50% of grain products as whole grains, plate waste decreased overall. The review also found that the implementation of the HHFKA led to a 23% increase in fruit selection.\textsuperscript{43} Noting that as of June 2014, 90% of schools participating in the NSLP have implemented the guidelines of the Healthy, Hunger-Free Kids Act, a significant potential for overall increased fruit intake exists.\textsuperscript{44} Further, initial studies suggest that the implementation of the HHFKA may be contributing positive effects to the childhood obesity epidemic. In early 2015, Terry-McElrath, O’Malley, and Johnston published their findings from a cross-sectional analysis of 22,716 eighth graders and 30,596 tenth and 12\textsuperscript{th} graders attending schools that participate in the NSLP. The researchers identified a subset of USDA meal standards and subsequently found a significant reduction in the odds of overweight/obesity was among high school students when 3 or more of these components were available in each school meal.\textsuperscript{45}

While regulations are now in place to require that schools offer healthy, nutrient-dense foods to American students, students are not required to eat them. School foodservice personnel may retain the ability to directly affect what the children actually consume. Therein resides great opportunity for schools to utilize their resources, both human and material, to further influence healthy meal behaviors. Studies show that producing school meals that are more visually attractive and convenient to the students generates an increase in both purchasing and consumption.\textsuperscript{17,18} In 2011, a team from Cornell University implemented minor procedural and organizational changes to several New York junior-senior high school cafeterias in the hopes of increasing fruit and vegetable consumption. Simple changes such as placing bowls or tiered stands of fresh
fruit by the cash register and labeling vegetables with appealing descriptions were employed to incite their selection. Verbal prompting by cafeteria employees was used to encourage or remind students to choose a produce item as a component of their meal. Following these cafeteria modifications, fruit and vegetable consumption showed significant increases of 18% and 25%, respectively. Another small study conducted in a different New York high school offered a convenience, expedited line of only “healthier” food choices, resulting in an increased proportion of these foods being consumed.

Few studies have been conducted to determine the nutrition knowledge of the school nutrition manager or how this understanding affects the meal selection choices made by students in the cafeteria, but several support this supposition. A 2013 review published in the American Journal of Public Health explicitly encourages food service worker nutrition training. The report’s authors found that the nutritional profile of institutional meals, including those served in school cafeterias, is affected by multiple factors; among them, the skills and empowerment of food service workers, regulations, monitoring, and funding. Each of these elements contribute by supplementing worker skillsets and knowledge. Through proper training, food service employees obtain the opportunity to improve the nutrition of the foods served and reduce instances of diet-related diseases related of their customer base. Supporting this notion, data from the 2006 School Health Policies and Practices Study Food Service School Questionnaire indicates that those schools requiring nutrition managers to complete a foodservice training program present with more healthy overall food preparation and fewer unhealthy offerings than schools who do not maintain such a requirement. In 2014, Lucarelli, et al
reported that school personnel partaking in an intervention to promote healthy school environments through school self-assessment and action planning believe that both students and food service staff should receive nutrition education.\textsuperscript{47}

\textit{Smarter Lunchroom Movement}

Out of concern for the current eating habits of American children and a desire to change them, a grassroots movement began in 2009 to create research-based cafeterias that would yield evidence-based outcomes to drive the evolution of school lunchrooms into mechanisms of healthful eating promotion. In 2010, Dr. Brian Wansink, of the Cornell University Food and Brand Lab, and Dr. David Just collaborated to create the Cornell Center for Behavioral Economics in Child Nutrition Programs (The BEN Center). The BEN Center’s chief purpose is to generate innovative proposals in the areas of child health as it relates to the school environment and areas of behavioral science. Since its inception, the BEN Center has used research from the Food and Brand Lab to provide schools across the US with evidence-based strategies to drive healthier eating habits in their students through the \textit{Smarter Lunchroom Movement}.\textsuperscript{48}

A key focus of the BEN Center and the \textit{Smarter Lunchroom Movement} is the application of behavioral economics to school meals. This principle suggests that if individuals are forced into doing something, they may rebel. Accordingly, that if people feel they have made a decision on their own, they adopt ownership of and pride in it. Therefore, the \textit{Smarter Lunchroom Movement} implies that the key to successful implementation of federal nutrition mandates, such as the Healthy, Hunger-Free Kids Act, is to direct the food-related choices of students in a subtle manner, so as not to
appear dictatorial. Such changes are characteristically inexpensive: rearranging food displays so that the more nutrient-dense items are most visible and convenient, placing a basket of fresh fruit by the cash register, or providing a choice in vegetables, to name a few.\textsuperscript{49} A 2012 study published by a group of Smarter Lunchroom researchers found that when vegetables were given creative names (e.g., “X-ray Vision Carrots”, “Power Punch Broccoli”, “Silly Dilly Green Beans”), more elementary school opted to add the items to their tray and subsequently consumed more of the vegetable than those students provided with the same product with a generic name (e.g., “Food of the Day”).\textsuperscript{50} This methodology has been so widely accepted that in 2014 the USDA offered its support with an award of $5.5 million in grant funding to assist NSLP participating schools in the implementation of \textit{Smarter Lunchroom Movement} strategies to increase student selection of fruits, vegetables, whole grains, legumes and low/no-fat dairy.\textsuperscript{51}

\textit{Children’s Healthcare of Atlanta’s Strong4Life}

In 2011, the Child and Adolescent Health Measurement Initiative stated that 35\% of children in the state of Georgia are overweight or obese.\textsuperscript{52} This brands Georgia the 10\textsuperscript{th} most obese state in the US for children. In an effort to reverse childhood obesity and its associated diseases in children residing in Georgia, Children’s Healthcare of Atlanta (CHOA) launched the wellness-focused, community-based Strong4Life arm that same year. The Strong4Life program uses policy change motions, public awareness campaigns, partnerships with healthcare providers and community organizations, and school programs to reach and generate change in families across Georgia.\textsuperscript{53} Using principles and methodologies of the \textit{Smarter Lunchroom Movement}, Strong4Life created
its School Nutrition Program to educate cafeteria managers on the importance of proper nutrition and further empower them of the opportunity they maintain to convey this significance to students. This training program focuses on the “4 P’s” (“Presentation”, “Prompting”, “Promotion”, and “Partnerships”): “Presentation” encourages the managers to place emphasis on attractive, enticing displays and arrangement of foods to promote nutritious food selection; “Prompting” stresses the effects of a gentle verbal nudge from the lunch server to the student to select a fruit, vegetable, or other nutrient-dense product; “Promotion” encourages the use of creative branding, fun menu descriptors, and special events; and “Partnerships” reinforces the idea that teachers, school administrators, parents, and the community at large are all in partnership with school nutrition staff in the initiative to produce healthy children.
CHAPTER III

Methods

The proposed study is a secondary analysis of data obtained as part of the Strong4Life School Nutrition Program. The program began as a pilot study in 2012 in Fulton County, Georgia and was further rolled out to a group of elementary schools within the Chatham County school district in 2013. The proposed study will utilize the Chatham County data. The demographic breakdown of students attending these schools was 7% Hispanic, 0.3% American Indian, 1.8% Asian, 54.6% black, 0.2% Pacific Islander, 29.6% white, and 6.5% mixed race in the 2012-13 school year. During the 2013-14 school year, the distribution was 6% Hispanic, 0.3% American Indian, 1.9% Asian, 54.6% black, 0.1% Pacific Islander, 30.99% white, and 6.2% mixed race.

The Strong4Life School Nutrition Program involves an initial dietitian-led 90 to 120 minute training assembly for school nutrition managers (n=33) in 52 schools during the annual back-to-school session. It is accompanied by a pre- and post-survey (Appendix B) and is facilitated by a PowerPoint presentation (Appendix C) with the following objectives: to convey the impact the school setting has on student nutrition; to convey the role of school nutrition providers in improving student nutrition; to identify nutrition principles that promote healthy behaviors; and to pinpoint low/no cost methods to encourage healthy choices in the school cafeterias. The surveys focus on general nutrition knowledge (i.e., “Which of these is an example of a sugary drink?”), understanding of federal nutrition-related guidelines (i.e., “What portion of a plate does
the USDA’s MyPlate recommend to consist of fruits and vegetables?”), and individual school/job-specific information (i.e., “Which of the following are the top 3 barriers to serving healthier meals in your schools”). Increase in nutrition knowledge was determined by an increase in the number of cumulative correct answers in the basic nutrition session.

To determine if a relationship exists between the knowledge and empowerment obtained from the training session by nutrition managers and purchasing habits of students, school production records (Appendix D) were reviewed to describe the purchases of plain, skim milk compared to higher fat and/or flavored milks and total fruit and vegetable purchases before and after the Strong4Life training session. Food production data from 12 elementary schools within the Chatham County school district was obtained for two separate one week periods. The first collection period, March 11 through 15, 2013, occurred prior to the Strong4Life training. The second collection period took place from October 14 through 18 of the same year. The data detailed items prepared and items sold and detailed the specific entrée, side dish, and beverage component. For purposes of this analysis, total fruits, vegetables, milk types, and juices were reviewed. Prepared/offered fruits included: sliced peaches, fruit cups, apple wedges, orange wedges, pears, applesauce, strawberries, pineapple cups, grapefruit, honeydew, cantaloupe, kiwi, and apples with cranberries. Prepared/offered vegetables included: broccoli, green beans, corn, carrots, baby carrots with ranch dressing, okra and tomatoes, Romaine salad, spinach salad, sweet potatoes, collard greens, mixed vegetables, summer squash, green peas, and lima beans. Milk options were comprised of
skim/no-fat, 1%/low-fat, chocolate, strawberry and vanilla. While not available on a
daily basis and not offered at all included schools, fruit juices were offered during the
study period; flavors included blueberry, orange, apple, grape, apple cherry, and fruit
punch.

The effect of the training session on cafeteria organizational changes to improve
student selection of food items was evaluated using a Cafeteria Observation form
(Appendix E). The evaluation form consists of 21 questions related to the physical
environment of the cafeteria (e.g., fresh fruits and vegetables are displayed at the front of
the line, tasteful wall art is displayed highlighting fun, food-oriented or physical activity
health messages, etc.). An exemption from IRB approval was requested for this study
from the Georgia State University IRB and was received.

Statistical Analysis

The results of the manager pre- and post-training surveys and food production
data were described using frequency statistics. A Wilcoxon signed-rank test was used to
compare pre- and post-survey scores. The percent of food items (e.g., skim milk, apples,
carrots, etc.) purchased before and after the training session were compared.
Organizational changes were categorized as Improved vs. Not Improved. Improved is
defined as a total score of 1 or more points higher on the post-Cafeteria Observation form
than on the pre-Cafeteria Observation form. The numbers awarded for each of the 21
questions represent the practices in line with Smarter Lunchroom Movement practices
and were summed to determine if the cafeteria environment has improved. For example,
a “yes” answer to “Fresh fruits and/or vegetables are displayed near the checkout”
received a “1” out of a possible “1”; a “no” received a “0”. Questions 1, 2, 3, 4, 6, 7, 10, 12, 14, 16, 17, 18, 19, 20, and 21 were scored using the following scale: Yes = 1 point, No = 0 points (as a positive response indicates a practice consistent with the Smarter Lunchroom Movement). Conversely, questions 5, 8, 9, 11, 13, and 15 were scored using the following scale: Yes = 0 points, No = 1 point because a positive response is not consistent with the guidelines. If N/A was selected for any question no points will be assigned and that school will not be factored into the total allocation for that particular question. The best practice percentage for each question was compared between the pre- and post- Cafeteria Observation forms. The purchasing habits of students were categorized as improved (increase in plain, skim or 1% milk and fruits and vegetables) vs. declined (flavored and high fat milks, reduction in fruits and vegetables). Statistical analyses were performed using SPSS (version 20.0, SPSS, Inc., Chicago, IL).
CHAPTER IV

Results

A total of 33 school nutrition managers participated in the dietitian-led training program. Thirty pre-surveys and 33 post-surveys were completed. Identifying information of the participating managers was limited to the last 4 digits of their phone number, birth month and birth date. Of the 30 managers who completed both pre- and post-survey forms, 23 (77%) provided identifying information and were included in this analysis. The pre- and post-survey forms contained the same four general nutrition questions, one of which allowed for multiple selections, followed by a series of opinion questions (Appendix B). Each completed survey was scored using an answer key. The maximum possible score was 7 points (4 points were allocated for question 1 because it allowed for multi-answer selection; the remaining three questions received 1 point each). The average score of the pre-survey was 4.9; the average score of the post-survey was 5.8, representing an increase of 18.4%. The percent of correct responses to the first four questions on the pre- and post-training surveys are shown in Figure 1. Twelve participants received a higher score after the training session, 10 had no change in score, and one participant’s score decreased following the training. Improvements were shown in each of the basic nutrition questions, particularly in the proper identification of the MyPlate recommended portion of fruits and vegetables. Managers also showed improved knowledge in utilizing the ingredients list vs. the front of the package labeling or brown color of a food item to determine if the product is a whole grain.
During the pre-survey, the managers were asked to select three choices from a list of nine potential barriers to serving healthier meals in their respective schools. The majority of managers (77%) indicated that students were not interested in healthy meals. The second and third most common barriers were “too much waste” (40%) and “too expensive” (33%). Most managers (72%) indicated that they “strongly agree” they would like to encourage changes in the cafeteria to promote healthy choices and that they felt confident in their abilities to provide guidance to cafeteria staff to make such changes (73%) (Table 1). Following the training, 90% of managers strongly agreed that they would like to encourage healthy changes in the cafeteria and the vast majority (94%) expressed confidence in their individual ability to guide staff members to make these changes. In the pre-survey, 86% selected “strongly agree” or “agree somewhat” when asked if they felt able to serve as positive role models in the school cafeteria. When asked the same question in the post-survey, all of the managers indicated assurance in
their abilities to act as a positive role model. The pre- and post-surveys also inquired about the managers’ perception of the severity of overweight and obesity in children in the state of Georgia and within their particular school(s) in Chatham County. Both before and after the training, ~90% of managers indicated that obesity and overweight is a “very serious” or “somewhat serious” problem within Chatham County schools (Table 2). Perception of overweight and obesity being “very serious” or “somewhat serious” in the state of Georgia increased from 96.5% to 100% following the training.

| Table 1. Responses to Pre- and Post-survey re: School Nutrition (pre: n=30; post: n=33) |
|-----------------------------------------------|----------------|----------------|-----------------|-----------------|-----------------|-----------------|
|                                               | Strongly Agree | Agree Somewhat | Neither Agree nor Disagree | Disagree Somewhat | Strongly Disagree |
|                                               | Pre | Post | Pre | Post  | Pre | Post  | Pre | Post  | Pre | Post  |
| Verbal encouragement is important when helping kids choose fruits, vegetables and other healthy options. | 93.1% | 90.9% | 3.4% | 9.1% | 0.0% | 0.0% | 0.0% | 0.0% | 3.4% | 0.0% |
| In my job, I can play an important role in improving nutrition and promoting healthy habits to prevent childhood obesity. | 83.3% | 87.9% | 13.3% | 12.1% | 0.0% | 0.0% | 0.0% | 0.0% | 3.3% | 0.0% |
| The meals served and the environment in school cafeterias plays an important role in childhood obesity prevention. | 72.4% | 87.5% | 17.2% | 9.4% | 3.4% | 0.0% | 3.4% | 3.1% | 3.4% | 0.0% |
| I am able to serve as a positive role model in the school cafeteria. | 72.4% | 93.8% | 13.8% | 6.3% | 10.3% | 0.0% | 0.0% | 0.0% | 3.4% | 0.0% |
| I would like to encourage changes in the cafeteria that promote healthy choices. | 72.4% | 90.3% | 24.1% | 6.5% | 0.0% | 3.2% | 0.0% | 0.0% | 3.4% | 0.0% |
| I am ready/confident to provide guidance to staff on making changes in the cafeteria. | 73.3% | 94% | 23.3% | 6% | 0.0% | 0% | 0.0% | 0% | 3.3% | 0% |
Although the majority of students, both before and after the nutrition manager training, chose flavored milk over plain, half of the schools (n=6) showed improvement in the percentage of students who selected skim or 1% non-flavored milk (Figure 2). Improvements varied from 1% to 18% of total students who selected skim or 1% plain milk. Seven schools (58.3%) showed an improvement in the percentage of fruit sold between March and October, whereas 33.3% (n=3) showed an improvement in vegetables sold during this time period (Figure 3). Conversely, 4 schools showed decreased sales of both fruits and vegetables in October as compared to March.

| Table 2. Responses to Pre- and Post-survey re: Obesity (pre: n=30; post: n=33) |
|-----------------------------------------------|-----------------|-----------------|------------------|------------------|------------------|------------------|------------------|
|                                               | Very serious problem | Somewhat serious problem | Not too much of a problem | Not a problem at all | Not sure |
| ---                                           | Pre | Post | Pre | Post | Pre | Post | Pre | Post | Pre | Post |
| How much of a problem do you think childhood overweight and obesity is in your school? | 43.3% | 45.5% | 43.3% | 45.5% | 10.0% | 9.1% | 0.0% | 0.0% | 3.3% | 0.0% |
| How much of a problem do you think childhood overweight and obesity is in the state of | 79.3% | 93.8% | 17.2% | 6.3% | 0.0% | 0.0% | 0.0% | 0.0% | 3.4% | 0.0% |
Cafeteria observations were conducted at 19 individual schools, but observations both prior and post training were completed for only 13 schools. Therefore, only these 13 schools were included in the results. The cafeteria observation form questions and the best answer for each question is shown in Appendix F. One point was allocated to each line item in which the best answer was selected for a maximum number of 21 points. Scores prior to the nutrition manager training ranged from 6 to 14. Scores following the training ranged from 9 to 14 (Table 3). More than half of the schools (69%; n=9)
improved after the training, whereas the score for 23% (n=3) declined. The remaining school showed no change between the initial and final observations. The most common improvement was the placement of fruits and vegetables to provide a colorful variety. The arrangement of easily visible menu labeling, use of descriptive names for menu items, and addition of food or nutrition-themed wall art each improved after the training. Multiple schools chose to display Strong4Life posters or MyPlate depictions; one school chose to create their own owl-themed display entitled “Who Grows Strong with Good Nutrition? Everyone!”.

The list of schools in which food production data was collected did not mirror the list of schools of which cafeteria observations were performed; complete production data and cafeteria observations were collected for just 10 schools. Therefore, we were unable to determine if the cafeteria environment contributed to a change in student sales.

<table>
<thead>
<tr>
<th>School</th>
<th>Pre Score</th>
<th>Post Score</th>
<th>Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>School 1</td>
<td>13</td>
<td>13</td>
<td>0</td>
</tr>
<tr>
<td>School 2</td>
<td>6</td>
<td>10</td>
<td>4</td>
</tr>
<tr>
<td>School 3</td>
<td>8</td>
<td>13</td>
<td>5</td>
</tr>
<tr>
<td>School 4</td>
<td>8</td>
<td>13</td>
<td>5</td>
</tr>
<tr>
<td>School 5</td>
<td>10</td>
<td>14</td>
<td>4</td>
</tr>
<tr>
<td>School 6</td>
<td>10</td>
<td>9</td>
<td>-1</td>
</tr>
<tr>
<td>School 7</td>
<td>7</td>
<td>14</td>
<td>7</td>
</tr>
<tr>
<td>School 8</td>
<td>11</td>
<td>12</td>
<td>1</td>
</tr>
<tr>
<td>School 9</td>
<td>10</td>
<td>13</td>
<td>3</td>
</tr>
<tr>
<td>School 10</td>
<td>9</td>
<td>12</td>
<td>3</td>
</tr>
<tr>
<td>School 11</td>
<td>12</td>
<td>10</td>
<td>-2</td>
</tr>
<tr>
<td>School 12</td>
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<td>11</td>
<td>1</td>
</tr>
<tr>
<td>School 13</td>
<td>14</td>
<td>12</td>
<td>-2</td>
</tr>
</tbody>
</table>
CHAPTER V
Discussion & Conclusion

Discussion

The purpose of this study was to determine if school nutrition managers demonstrated an increase in nutrition knowledge and belief in the importance of their role as nutrition providers after attending a dietitian led training session. We hypothesized that the managers’ knowledge would increase after the training session and that they would enact changes to the presentation of food in the cafeteria that would then lead to an increase in the purchase of more nutrient-dense food and beverage offerings by students. We found that nutrition managers presiding over elementary schools within the same school district displayed increase in nutrition knowledge and belief in themselves as nutrition role models and that they implemented changes within the school cafeterias to promote positive nutrition behaviors after the training. Therefore, we reject our first null hypothesis. Additionally, changes were seen both in student food and beverage selection and in the school cafeteria operations. Because of these changes, we also reject our second hypotheses.

Following the dietitian-led training session, managers overall showed increased basic nutrition knowledge. Improvements were observed for each of the questions. Understanding of the portion size of fruits and vegetables related to the MyPlate figure increased from 43% prior to training to almost 88% following the training; identification of the best milk choice for students increased from 57% to 100%. Both prior to and
following completion of the training, the majority of managers indicated a belief in the importance of their role and the school cafeteria environment itself in promoting healthy eating behaviors and in childhood obesity prevention. As a group, a 21% increase was shown post-training in both manager belief in their ability to serve as positive role models in the cafeteria and in their individual ability to provide guidance to staff to facilitate positive changes in the cafeteria. Post-training, school nutrition managers’ perception of the overweight and obese problem amongst students in their respective schools remained the same. The number of overweight and obese students in Chatham County schools is not available, but a third of children in the state of Georgia overall are currently overweight and obese\(^2\). The percentage of managers that indicated overweight and obese is a “very serious problem” in the state of Georgia more than doubled on the post-test, showing a much improved understanding of the severity of the obesity epidemic.

<table>
<thead>
<tr>
<th>Change</th>
<th># of Managers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Speak to students/incorporation of verbal prompts</td>
<td>8</td>
</tr>
<tr>
<td>Rearrange items on serving line and in cooler so that most nutritious items are at the front</td>
<td>7</td>
</tr>
<tr>
<td>Creation of marketing to promote nutrition and healthy habits</td>
<td>7</td>
</tr>
<tr>
<td>Create a more appealing/decorative serving line</td>
<td>4</td>
</tr>
<tr>
<td>Educate staff on basic nutrition and its importance</td>
<td>3</td>
</tr>
<tr>
<td>Offer samples to promote healthy foods</td>
<td>2</td>
</tr>
</tbody>
</table>

More than two-thirds of schools included in the cafeteria observations reviews showed improvement following the nutrition training (69%); just over half of these schools improved their total score 4 or more points (56%). As part of the post – survey,
managers were asked to provide detail of the changes they intended to incorporate into their cafeterias (Table 4). Approximately a third of the managers specified an intention to incorporate verbal prompting to encourage student selection of fruits, vegetables, and other nutrient dense foods. However, the percentage of schools actually employing this technique in the post-training observation remained at zero. It was noted that many of these schools were serving “pre-portioned meals”, but cafeteria staff still retain the ability to encourage the students to try the fruits and vegetables in the meal. The incorporation of marketing to promote healthy habits and adjusting the placement of foods on the serving line to highlight the most nutrient-dense items were also popular suggested changes from the managers. In the pre-observation, almost 70% of schools displayed nutrition or healthy habit wall art and promotion within the cafeteria; in the post-observation, 100% of schools were utilizing such marketing tools. In the post-observation period, only two of the schools (15%) had moved the flavored milks to the back of the cooler to make low and no-fat milk the most prominent and easily accessible option. But, 46% of schools repositioned the hot serving line to showcase the vegetables first; 15% already had this arrangement in place during the pre-observation.

The majority of students showed improved selection of fruit items in the sample of schools days reviewed after the manager training. Vegetable selection actually decreased between the two time periods. Purchase of 1% milk increased during this time, but purchase of skim milk decreased slightly. Flavored milk purchases decreased overall, with chocolate milk selection specifically decreasing more than 8% throughout the time period that was examined. Comparatively, the offering of flavored milk, in particular chocolate milk, far outweighed the offering of low or no fat plain milk. In many schools
included in this exercise, more than half of milk offered to students was chocolate. In one school in particular, 77% of milk provided was chocolate. The distribution of change in purchasing habits of juice was more varied: over 8% of schools showed an increase in the selection of juice following the manager training, whereas 25% showed decreased purchase of juice during this time. Of the remaining schools, a quarter did not indicate the provision of juice at all and more than 40% showed no change in juice purchasing habits. Considering the data collected, no determinations can be made regarding the cause of this perceived behavior change.

Prior to this analysis, we intended to investigate if a change in manager nutrition knowledge and/or beliefs in the importance of proper nutrition contributed to changes in the school cafeteria nutrition environment. Further, we expected to examine if an association exists between these changes in the school cafeteria and variations in student purchasing habits. However, the design of the Strong4Life training program did not provide adequate identifying information to allow for a linkage between the two data sets.

This study has multiple limitations. The inability to link the change in student purchasing behaviors and the knowledge obtained and/or transformed perspectives of the school nutrition managers is the primary restraint. The managers were not asked to provide their names in the pre or post surveys as a manner of privacy. However, the inclusion of a unique identifier that would relate to the individual schools in which he or she oversees would allow for a relationship to be derived between any pre and post training changes in the survey responses, school cafeteria observations, and purchasing habits of students.
The pre and post surveys did not request demographic information (e.g., race, number of schools managed, tenure as school nutrition manager, etc.). The inclusion of this information would be helpful to draw further conclusions based upon the individual responses. Overweight and obese occurrence rates of students would also allow for further analysis as it relates to nutrition manager knowledge of nutrition and the obesity epidemic.

We have several concerns about the accuracy of the food production data. The food production reports, provided by representatives from the Chatham County school district, detailed the number of each food and beverage item prepared and served. Frequently, these numbers matched exactly (e.g., 350 portions of carrots prepared and 350 portions of carrots served/sold). Additionally, several of the school food production data sets provided incomplete data. In these instances, one or more of the ten analyzed school days indicated that “0” servings of all foods and beverages were prepared and subsequently sold. The data for these schools was not used, contributing to a reduced sample size. In future iterations of this program, pre- and post-manager training food production reports and cafeteria observations are needed for all schools in which a nutrition manager participates in the training exercise. It is also important to note that benchmark food production data was provided from the spring semester of the 2012 – 2013 school year, whereas the post – training data was generated from the fall semester of the 2013 – 2014 school year. This time difference suggests that the sample of students was different between the two data sets.
Conclusion

School nutrition managers showed increased nutrition knowledge and belief in their individual ability to act as a role model in the school cafeteria after completing a dietitian-led training session. We were unable to evaluate the association between increased nutrition knowledge of managers and changes in student food purchasing habits due to the lack of key identifier between data sets. Future iterations of this training program should include collection of the name of the school(s) in which the manager presides to determine association between increased nutrition knowledge and/or changed perception of role in promoting healthy habits and changes in student purchasing habits.
REFERENCES


APPENDICES
Executive Summary

Eating and physical activity patterns that are focused on consuming fewer calories, making informed food choices, and being physically active can help people attain and maintain a healthy weight, reduce their risk of chronic disease, and promote overall health. The Dietary Guidelines for Americans, 2010 exemplifies these strategies through recommendations that accommodate the food preferences, cultural traditions, and customs of the many and diverse groups who live in the United States.


Dietary Guidelines recommendations have traditionally been intended for healthy Americans ages 2 years and older. However, Dietary Guidelines for Americans, 2010 is being released at a time of rising concern about the health of the American population. Poor diet and physical inactivity are the most important factors contributing to an epidemic of overweight and obesity affecting men, women, and children in all segments of our society. Even in the absence of overweight, poor diet and physical inactivity are associated with major causes of morbidity and mortality in the United States. Therefore, the Dietary Guidelines for Americans, 2010 is intended for Americans ages 2 years and older, including those at increased risk of chronic disease.

Dietary Guidelines for Americans, 2010 also recognizes that in recent years nearly 15 percent of American households have been unable to acquire adequate food to meet their needs. This dietary guidance can help them maximize the nutritional content of
their meals. Many other Americans consume less than optimal intake of certain nutrients even though they have adequate resources for a healthy diet. This dietary guidance and nutrition information can help them choose a healthy, nutritionally adequate diet.

The intent of the Dietary Guidelines is to summarize and synthesize knowledge about individual nutrients and food components into an interrelated set of recommendations for healthy eating that can be adopted by the public. Taken together, the Dietary Guidelines recommendations encompass two overarching concepts:

- **Maintain calorie balance over time to achieve and sustain a healthy weight.** People who are most successful at achieving and maintaining a healthy weight do so through continued attention to consuming only enough calories from foods and beverages to meet their needs and by being physically active. To curb the obesity epidemic and improve their health, many Americans must decrease the calories they consume and increase the calories they expend through physical activity.

- **Focus on consuming nutrient-dense foods and beverages.** Americans currently consume too much sodium and too many calories from solid fats, added sugars, and refined grains. These replace nutrient-dense foods and beverages and make it difficult for people to achieve recommended nutrient intake while controlling calorie and sodium intake. A healthy eating pattern limits intake of sodium, solid fats, added sugars, and refined grains and emphasizes nutrient-dense foods and beverages—vegetables, fruits, whole grains, fat-free or low-fat milk and milk products, seafood, lean meats and poultry, eggs, beans and peas, and nuts and seeds.

A basic premise of the Dietary Guidelines is that nutrient needs should be met primarily through consuming foods. In certain cases, fortified foods and dietary supplements may be useful in providing one or more nutrients that otherwise might be consumed in less than recommended amounts. Two eating patterns that embody the Dietary Guidelines are the USDA Food Patterns and their vegetarian adaptations and the DASH (Dietary Approaches to Stop Hypertension) Eating Plan.

A healthy eating pattern needs not only to promote health and help to decrease the risk of chronic diseases, but it also should prevent foodborne illness. Four basic food safety principles (Clean, Separate, Cook, and Chill) work together to reduce the risk of foodborne illnesses. In addition, some foods (such as milks, cheeses, and juices that have not been pasteurized, and undercooked animal foods) pose high risk for foodborne illness and should be avoided.

The information in the Dietary Guidelines for Americans is used in developing educational materials and aiding policymakers in designing and carrying out nutrition-related programs, including federal food, nutrition education, and information programs. In addition, the Dietary Guidelines for Americans has the potential to offer authoritative statements as provided for in the Food and Drug Administration Modernization Act (FDAMA).

The following are the Dietary Guidelines for Americans, 2010 Key Recommendations, listed by the chapter in which they are discussed in detail. These Key Recommendations are the most important in terms of their implications for improving public health. To get the full benefit, individuals should carry out the Dietary Guidelines recommendations in their entirety as part of an overall healthy eating pattern.

---

2. Added sugars: Caloric sweeteners that are added to foods during processing, preparation, or consumed separately. Solid fats: Fats with a high content of saturated and/or trans fatty acids, which are usually solid at room temperature. Refined grains: Grains and grain products missing the bran, germ, and/or endosperm; any grain product that is not a whole grain.
3. Milk and milk products also can be referred to as dairy products.
4. Information on the type and strength of evidence supporting the Dietary Guidelines recommendations can be found at http://www.nutritioneducationlibrary.gov.
BALANCING CALORIES TO MANAGE WEIGHT

• Prevent and/or reduce overweight and obesity through improved eating and physical activity behaviors.

• Control total calorie intake to manage body weight. For people who are overweight or obese, this will mean consuming fewer calories from foods and beverages.

• Increase physical activity and reduce time spent in sedentary behaviors.

• Maintain appropriate calorie balance during each stage of life—childhood, adolescence, adulthood, pregnancy and breastfeeding, and older age.

FOODS AND FOOD COMPONENTS TO REDUCE

• Reduce daily sodium intake to less than 2,300 milligrams (mg) and further reduce intake to 1,500 mg among persons who are 51 and older and those of any age who are African American or have hypertension, diabetes, or chronic kidney disease. The 1,500 mg recommendation applies to about half of the U.S. population, including children, and the majority of adults.

• Consume less than 10 percent of calories from saturated fatty acids by replacing them with monounsaturated and polyunsaturated fatty acids.

• Consume less than 300 mg per day of dietary cholesterol.

• Keep trans fatty acid consumption as low as possible by limiting foods that contain synthetic sources of trans fats, such as partially hydrogenated oils, and by limiting other solid fats.

• Reduce the intake of calories from solid fats and added sugars.

• Limit the consumption of foods that contain refined grains, especially refined grain foods that contain solid fats, added sugars, and sodium.

• If alcohol is consumed, it should be consumed in moderation—up to one drink per day for women and two drinks per day for men—and only by adults of legal drinking age.5

5. See Chapter 3, Foods and Food Components to Reduce, for additional recommendations on alcohol consumption and specific population groups. There are many circumstances when people should not drink alcohol.
FOODS AND NUTRIENTS TO INCREASE

Individuals should meet the following recommendations as part of a healthy eating pattern while staying within their calorie needs.

- Increase vegetable and fruit intake.
- Eat a variety of vegetables, especially dark green and red and orange vegetables and beans and peas.
- Consume at least half of all grains as whole grains. Increase whole-grain intake by replacing refined grains with whole grains.
- Increase intake of fat-free or low-fat milk and milk products, such as milk, yogurt, cheese, or fortified soy beverages.
- Choose a variety of protein foods, which include seafood, lean meat and poultry, eggs, beans and peas, soy products, and unsalted nuts and seeds.
- Increase the amount and variety of seafood consumed by choosing seafood in place of some meat and poultry.
- Replace protein foods that are higher in solid fats with choices that are lower in solid fats and calories and/or are sources of oils.
- Use oils to replace solid fats where possible.
- Choose foods that provide more potassium, dietary fiber, calcium, and vitamin D, which are nutrients of concern in American diets. These foods include vegetables, fruits, whole grains, and milk and milk products.

Recommendations for specific population groups

Women capable of becoming pregnant?

- Choose foods that supply heme iron, which is more readily absorbed by the body, additional iron sources, and enhancers of iron absorption such as vitamin C-rich foods.
- Consume 400 micrograms (mcg) per day of synthetic folic acid (from fortified foods and/or supplements) in addition to food forms of folate from a varied diet.6

Women who are pregnant or breastfeeding?

- Consume 8 to 12 ounces of seafood per week from a variety of seafood types.
- Due to their high methyl mercury content, limit white (albacore) tuna to 6 ounces per week and do not eat the following four types of fish: tilefish, shark, swordfish, and king mackerel.
- If pregnant, take an iron supplement, as recommended by an obstetrician or other health care provider.

Individuals ages 50 years and older

- Consume foods fortified with vitamin B₁₂, such as fortified cereals, or dietary supplements.

BUILDING HEALTHY EATING PATTERNS

- Select an eating pattern that meets nutrient needs over time at an appropriate calorie level.
- Account for all foods and beverages consumed and assess how they fit within a total healthy eating pattern.
- Follow food safety recommendations when preparing and eating foods to reduce the risk of foodborne illnesses.

6. Fortified soy beverages have been marketed as “soy milk,” a product name consumers could see in supermarkets and consumer materials. However, FDA’s regulations do not contain provisions for the use of the term soy milk. Therefore, in this document, the term “fortified soy beverage” includes products that may be marketed as soy milk.
7. Includes adolescent girls.
8. “Folic acid” is the synthetic form of the nutrient, whereas, “folate” is the form found naturally in foods.
Appendix B. School Nutrition Pre-Survey and Post-Survey Forms

Strong4Life School Nutrition Training
Pre-Assessment - Nutrition Managers

Please list the following:
Last four digits of your cell phone: 
Your 2-digit birth month: 
Your 2-digit day of birth: 

1. Which of these is an example of a sugary drink? (check all that apply)
   - Water
   - 100% Fruit Juice
   - Chocolate Milk
   - Sports Drink
   - Don’t know

2. Which type of milk is best for students to drink?
   a. Skim, 0%, or 1% Plain Milk
   b. Flavored Milk
   c. Whole Milk
   d. 2% Plain Milk
   e. Don’t know

3. What portion of a plate does the USDA’s MyPlate recommend to consist of fruits and vegetables?
   a. 3/4
   b. 1/2
   c. 1/4
   d. 4/4 or whole plate
   e. Don’t know

4. How can you tell for sure that a grain product is a whole grain?
   a. By reading the ingredients list
   b. By reading the front of package
   c. It is brown
   d. All of the above
   e. Don’t know

5. Which of the following are the TOP 3 BARRIERS to serving healthier meals in your school? (Check the top 3 barriers)
   - Not enough time
   - Too difficult
   - Too expensive
   - Lack of healthy meal recipes
   - Lack of equipment needed to prepare
   - Students are not interested
   - Lack of parent support
   - Too difficult for students to eat
   - Too much wastage when served
   - Lack of nutrition knowledge and/or training
   - Other, please specify

Please indicate the extent to which you agree or disagree with each of the following statements:

6. Verbal encouragement is important when helping kids choose fruits, vegetables, and other healthy options.

   Strongly Agree
   Agree
   Neither agree nor disagree
   Disagree
   Strongly Disagree

   Somewhat
   Somewhat
   Somewhat
   Somewhat
   Somewhat

   PLEASE TURN OVER ————>

Eval: CS
Created: 1/31/13

Page 1 of 2
Strong4Life School Nutrition Training
Pre-Assessment- Nutrition Managers

Please indicate the extent to which you agree or disagree with each of the following statements:

7. In my job, I can play an important role in improving nutrition and promoting healthy habits to prevent childhood obesity.
   - Strongly Agree
   - Agree
   - Somewhat
   - Neither agree nor disagree
   - Somewhat
   - Disagree
   - Strongly Disagree

8. The meals served and the environment in school cafeterias play an important role in childhood obesity prevention.
   - Strongly Agree
   - Agree
   - Somewhat
   - Neither agree nor disagree
   - Somewhat
   - Disagree
   - Strongly Disagree

9. I am able to serve as a positive role model in the school cafeteria.
   - Strongly Agree
   - Agree
   - Somewhat
   - Neither agree nor disagree
   - Somewhat
   - Disagree
   - Strongly Disagree

10. I would like to encourage changes in the cafeteria that promote healthy choices.
    - Strongly Agree
    - Agree
    - Somewhat
    - Neither agree nor disagree
    - Somewhat
    - Disagree
    - Strongly Disagree

11. I am confident in my ability to provide guidance to staff on making changes in the cafeteria that will encourage healthy eating.
    - Strongly Agree
    - Agree
    - Somewhat
    - Neither agree nor disagree
    - Somewhat
    - Disagree
    - Strongly Disagree

Please select a response that best fits your opinion for each statement below.

12. How much of a problem do you think childhood overweight and obesity is in your school? Would you say it is ...
    - A very serious problem
    - A somewhat serious problem
    - Not too much of a problem
    - Not a problem at all
    - Not sure

13. How much of a problem do you think childhood overweight and obesity is in the state of Georgia? Would you say it is ...
    - A very serious problem
    - A somewhat serious problem
    - Not too much of a problem
    - Not a problem at all
    - Not sure
Strong4Life School Nutrition Training  
Post-Assessment- Nutrition Managers

Please list the following:

Last four digits of your cell phone:  
Your 2-digit birth month:  
Your 2-digit day of birth:  

1. Which of these is an example of a sugary drink? (check all that apply)
   - Water
   - 100% Fruit Juice
   - Chocolate Milk
   - Sports Drink
   - Don’t know

2. Which type of milk is best for students to drink?
   a. Skim, 0%, or 1% Plain Milk
   b. Flavored Milk
   c. Whole Milk
   d. 2% Plain Milk
   e. Don’t know

3. What portion of a plate does the USDA’s MyPlate recommend to consist of fruits and vegetables?
   a. 3/4
   b. 1/2
   c. 1/4
   d. 4/4 or whole plate
   e. Don’t know

4. How can you tell for sure that a grain product is a whole grain?
   a. By reading the ingredients list
   b. By reading the front of the package
   c. It is brown
   d. Don’t know

Please the extent to which you agree or disagree with each of the following statements.

5. Verbal encouragement is important when helping kids choose fruits, vegetables, and other healthy options.

<table>
<thead>
<tr>
<th>Strongly Agree</th>
<th>Agree Somewhat</th>
<th>Neither agree</th>
<th>Disagree Somewhat</th>
<th>Strongly Disagree</th>
</tr>
</thead>
</table>

6. In my job, I can play an important role in improving nutrition and promoting healthy habits to prevent childhood obesity.

<table>
<thead>
<tr>
<th>Strongly Agree</th>
<th>Agree Somewhat</th>
<th>Neither agree</th>
<th>Disagree Somewhat</th>
<th>Strongly Disagree</th>
</tr>
</thead>
</table>
Strong4Life School Nutrition Training  
Post-Assessment- Nutrition Managers

Please the extent to which you agree or disagree with each of the following statements.

7. The meals served and the environment in school cafeterias plays an important role in childhood obesity prevention.

    | Strongly Agree | Agree | Neither agree | Disagree | Strongly Disagree |
    |----------------|-------|---------------|----------|-------------------|

8. At the completion of this training, I am able to serve as a positive role model in the school cafeteria.

    | Strongly Agree | Agree | Neither agree | Disagree | Strongly Disagree |
    |----------------|-------|---------------|----------|-------------------|

9. I would like to encourage changes in the cafeteria that promote healthy choices.

    | Strongly Agree | Agree | Neither agree | Disagree | Strongly Disagree |
    |----------------|-------|---------------|----------|-------------------|

10. I am confident in my ability to provide guidance to staff on making changes in the cafeteria.

<table>
<thead>
<tr>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Neither agree</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
</tr>
</thead>
</table>

11. The presentation held my interest.

    | Strongly Agree | Agree | Neither agree | Disagree | Strongly Disagree |
    |----------------|-------|---------------|----------|-------------------|

12. Overall, I was satisfied with the quality of this presentation.

    | Strongly Agree | Agree | Neither agree | Disagree | Strongly Disagree |
    |----------------|-------|---------------|----------|-------------------|
Strong4Life School Nutrition Training
Post-Assessment- Nutrition Managers

Please select a response that best fits your opinion for each statement below.

13. How much of a problem do you think childhood overweight and obesity is in your school? Would you say it is ...

<table>
<thead>
<tr>
<th>A very serious problem</th>
<th>A somewhat serious problem</th>
<th>Not too much of problem</th>
<th>Not a problem at all</th>
<th>Not Sure</th>
</tr>
</thead>
</table>

14. How much of a problem do you think childhood overweight and obesity is in the state of Georgia? Would you say it is...

<table>
<thead>
<tr>
<th>A very serious problem</th>
<th>A somewhat serious problem</th>
<th>Not too much of problem</th>
<th>Not a problem at all</th>
<th>Not Sure</th>
</tr>
</thead>
</table>

15. What, if any, change do you plan to make in your school cafeteria based on what you learned from this training.

_________________________________________________________

_________________________________________________________

_________________________________________________________

16. Please feel free to provide additional feedback and comments below.

_________________________________________________________

_________________________________________________________

_________________________________________________________
Appendix C. School Nutrition Training Presentation

Slide 1

Slide 2

Learning Objectives

1. Recognize the impact the school setting has on nutrition for students.

2. Recognize your role as a school nutrition provider in improving nutrition of students.

3. Identify nutrition principles to promote healthy behaviors in students.

4. Identify low cost/no cost ways to encourage healthy choices in a school cafeteria.
Overview

• Childhood obesity in the U.S. has increased more than 300% in the last 30 years
• Obesity rates for school age children continue to escalate
• Ability to impact nearly # students through School System.

Let’s Stop the Cycle

• Childhood obesity can lead to heart disease, type 2 diabetes and hypertension—now and in the future.
Quality of Life Issues Related to Obesity

Psychological Issues

- Depression
- Anxiety
- Social isolation
- Bullying
Slide 7

1 in 3

Slide 8

Healthy Choices for Healthy Kids

- Make half your plate veggies & fruits
- Drink more water & limit sugary drinks
- Be active for 60 minutes
- Limit screen time to one hour
Slide 9

**Why Promote Nutrition?**

- Eating patterns can be established early
- Reduce risk for sickness and disease
- Encourage eating a variety of foods

Slide 10

**Why Promote Nutrition?**

When it comes to overweight/obesity:

*Prevention is best*
Slide 11

Nutrition Patterns

School
Family
Community

Slide 12

STRONG4LIFE

McDonald's Happy Meal
Coca-Cola
Nutella
Golden Corral

Help Yourself to Happiness
Slide 13

How do we take back “happy”?

Slide 14

School Meals Impact
Environmental Change

How do we change the environment?

Slide 16

5,500,000,000
Lunchtime is part of the school day

MyPlate

Choose MyPlate.gov
Not About Diets

- Diets are generally temporary attempts at achieving optimal health.
- In order to impact our health more permanently, implement small changes that can be built upon to create and model a healthier way of life for our kids.

Key Messages of MyPlate

<table>
<thead>
<tr>
<th>5 Food Groups</th>
<th>Recommendation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fruits</td>
<td>Focus on fruits</td>
</tr>
<tr>
<td>Vegetables</td>
<td>Vary your veggies</td>
</tr>
<tr>
<td>Grains</td>
<td>Make at least ½ your grains whole grains</td>
</tr>
<tr>
<td>Protein</td>
<td>Go lean with protein</td>
</tr>
<tr>
<td>Dairy</td>
<td>Get your calcium rich foods</td>
</tr>
</tbody>
</table>

- Find your balance between food and physical activity
- Keep food safe to eat
Veggies and Fruits: Taste the Rainbow

- Contain vitamins, minerals and fiber.
- Eat a variety of colors—especially red, orange and dark green.
- Offer and encourage kids to eat a new fruit or vegetable on a regular basis.

Whole Grains

- Whole grains contain fiber and other nutrients.
- If a grain is brown, it does not necessarily mean it is a whole grain.
- Try incorporating whole grains slowly.
Protein

• Protein is a source of energy that helps our body build and repair tissue.
• Protein is found in both animal and plant foods.
• Choose lean proteins when possible: lean beef, fish, chicken, turkey, eggs, low-fat dairy, beans, peas, & lentils.

Water

• Our bodies are made of water, so it is important to drink water regularly.
• We need more water when exercising vigorously and in warm temperatures.
Slide 25

Dairy

• Children 2 years of age and older should be served 1% or skim milk.
• Serving low-fat milk & dairy products is an easy way to make sure students have proper nutrients for bone health.

Important source of calcium and vitamin D

Slide 26

Sugary Drinks

• Sugary drinks are high in calories and sugar.
• Sugary drinks should not be made part of a routine.
Slide 27

Sugary Drinks

Slide 28

What About Fruit Juice?

Limit juice to 4 to 6 oz. or less of 100% fruit juice.
Slide 29

National School Lunch Program

Healthy, Hunger Free Kids Act of 2010

Slide 30

Over 4,000
Slide 31

Lunched: Part 1

Slide 32

“Food Isn’t Nutritious Until Eaten”
What Influences Eating?

**Negative**
- Pressure
- Restriction
- Rewards

**Positive**
- Modeling
- Encouragement
- Repeated Exposure

What Doesn’t Work

- Removing the less healthy options
- Lowering the price of the vegetables
- Educating children that vegetables are healthy
Slide 35

Low Cost/No Cost Solutions

1. Presentation
2. Prompting
3. Promotion
4. Partnerships

Slide 36

Presentation

Evaluate the design of your space and the location of the foods and beverages to:

• Make the healthy choice the easy choice
• Make the healthy choice the fun choice
Slide 37

Make the Healthy Choice the Easy Choice

- Place foods at eye level
- Move less healthy foods out of reach
- Package “grab and go” foods
- Place low-fat milk in the front of the cooler
- Close the lid on the ice-cream cooler and make it opaque
- Create a speedy healthy check-out line
- Accept “cash-only” for a la carte items

Slide 38

Make the Healthy Choice the Fun Choice

- Use attractive fruit bowls
- Place vegetables first in the hot line
- Try different bars, like salad bars, baked potato bars, noodle bars and rice bars
- Label healthy items with fun and descriptive names
Slide 39

Presentation

Honey Glazed Carrots

Spiderman Spinach Salad

Slide 40

Prompting

• Verbal Prompts
• Nudging
Slide 41

The influence of a verbal prompt on school lunch fruit consumption: a pilot study
Marlene B. Schwartz*

![Bar chart showing the influence of a verbal prompt on school lunch fruit consumption.]

Slide 42

Prompting

- “Would you like broccoli or carrots?”
- “Would you like some Spiderman Spinach?”
- “Would you like an apple for later?”

*Figure 1: Mean Percentage of Children Taking and Eating Fruit Servings. Bars represent the percentage of children taking and subsequently eating fruit and juice at each school.
Slide 43

What Would Spiderman Eat?

- Priming using healthy foods
- Priming using role model’s expected food choices

Slide 44

Promotion

- Daily Announcements
- Taste Tests
- Menu Revitalization
- Branding
- Special Events
- Student Advisory Council
- Student Surveys/Voting
- Coupons/Punch Cards
Promotion

STRONG4LIFE

STRONG4LIFE HEALTHY HABITS

Make half your plate veggies & fruit

Be active for 60 minutes

Drink more water & limit sugary drinks

Limit screen time to one hour

Promotion

Make half your plate veggies & fruits.

Be Strong4Life.
Partnerships

Parents Community School Administrators Teachers

Lunched: Part 2
Slide 49

Your Role: Influencing Healthy Habits

- Provide a healthy environment
  - Can have a positive impact on child and family
- Model healthy behaviors
  - Set the example for others who live, work, and play around you

Slide 50

Your Role: Model the Behavior

- Engage children

  Children are more likely to model the positive behaviors of adults they know
Let’s Get Started

- Meet with your staff
- Assess your school cafeteria space
- Decide on 1-2 new changes you can make
- Make healthier options the easier choice
- Play a role in developing healthy habits for children

Contact Information

Ashley Skorcz, R.D., L.D.
- Program Coordinator, Child Wellness
- 404-785-7234
- ashley.skorczrd@choa.org

www.strong4life.com
Thank You.

Slide 54

- http://www.choosemyplate.gov/
- http://www.fruitsandveggiesmoresmatters.org/
- http://www.ellynsatter.com/
## Appendix D. Sample School Cafeteria Production Record

### Food/Nutrient Based Production Record

**Site:** BLOOMINGDALE ELEMENTARY  
**Date Range:** 03/11/2013 to 03/11/2013  
**Program:** National School Lunch  
**Cycle:** Cycle 3  
**Age Range:** 4 to 10

**Site:** 4052 BLOOMINGDALE ELEMENTARY  
**Date:** 03/11/2013

**Program:** National School Lunch  
**Menu Type:** Lunch

<table>
<thead>
<tr>
<th>Menu Item / Product Name</th>
<th>Portion Size</th>
<th>Number of Portions Planned</th>
<th>Total Portions Prepared</th>
<th>Total # Portions Prepared</th>
<th>Total # Portions Leftover</th>
<th>Actual # Adults / Students Served</th>
<th>Actual # Adults / Students Leftover</th>
<th>Actual # Portions Leftover</th>
<th>Feeding Figure</th>
<th>Projected</th>
<th>Actual</th>
<th>Week: 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>SANDWICH, TOASTED CHEESE</td>
<td>1501</td>
<td>1</td>
<td>236</td>
<td>236</td>
<td>0</td>
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<td>30</td>
<td>1</td>
<td>250</td>
<td>244</td>
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<tr>
<td>QUESADILLA</td>
<td>27</td>
<td>1</td>
<td>27 SERVING</td>
<td>27 SERVING</td>
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<td>34</td>
<td>0</td>
<td>0</td>
<td>3</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>BROCCOLI LEAF DILL</td>
<td>1/2 CUP</td>
<td>75</td>
<td>75 SERVING 75 SERVING</td>
<td>75</td>
<td>69</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>6</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>VEGETABLE, 4 PK</td>
<td>1/2 CUP</td>
<td>75</td>
<td>75 SERVING 75 SERVING</td>
<td>75</td>
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<td>0</td>
<td>7</td>
<td></td>
<td></td>
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<tr>
<td>ORANGE WEDGES</td>
<td>EACH</td>
<td>150</td>
<td>150 SERVING 150 SERVING</td>
<td>150</td>
<td>150</td>
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<tr>
<td>PEARS, FRESH</td>
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<td>105</td>
<td>105 PEAR 105 PEAR</td>
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<tr>
<td>MILK, 1%</td>
<td>CUP</td>
<td>21</td>
<td>21 1/2 PINT 21 1/2 PINT</td>
<td>21</td>
<td>21</td>
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<td>0</td>
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<td></td>
</tr>
<tr>
<td>MILK, STRAWBERRY</td>
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<td>34 1/2 PINT 34 1/2 PINT</td>
<td>34</td>
<td>34</td>
<td>0</td>
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</tr>
<tr>
<td>MILK, VANILLA</td>
<td>CUP</td>
<td>18</td>
<td>18 UNITS 18 UNITS</td>
<td>18</td>
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<tr>
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<td>7 1/2 PINT 7 1/2 PINT</td>
<td>7</td>
<td>7</td>
<td>0</td>
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<td>0</td>
<td></td>
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</tr>
</tbody>
</table>

**Temperature**  

<table>
<thead>
<tr>
<th>Beg.</th>
<th>End</th>
</tr>
</thead>
</table>
Appendix E. Cafeteria Observation Form

### School Cafeteria Observations

<table>
<thead>
<tr>
<th>Fruits and Vegetables</th>
<th>Yes</th>
<th>No</th>
<th>N/A</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Fresh fruits and/or vegetables are displayed at the front of the line</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Fresh fruits and/or vegetables are displayed near the checkout.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Fruits and vegetables are arranged to provide a colorful variety.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Vegetables are placed first in the hot line.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Snack and A la Carte</th>
<th>Yes</th>
<th>No</th>
<th>N/A</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>5. Processed/pre-packaged snack options are available.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. If a la carte pre-packaged snacks are available, students must request assistance to obtain them (i.e. they are not easily reached).</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. A la carte pre-packaged snacks are made visually less appealing. (i.e. ice cream lid is closed and made opaque)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8. Vending machines are available and operational in the student eating area during meal time.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Beverages</th>
<th>Yes</th>
<th>No</th>
<th>N/A</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>9. Flavored milk is available.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10. If flavored milk is available, it is placed behind and is less accessible than plain low-fat white milk.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11. Sugar-sweetened drinks are available to students during the meal. (i.e. soft drinks, lemonade, sweet tea, sports drinks)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12. Water is available and free of charge or for purchase.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>13. Water is available for purchase.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>14. 100% Fruit juice is available</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15. Fruit juice other than 100% juice available</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**TURN OVER**
# School Cafeteria Observations

## Menu Options

<table>
<thead>
<tr>
<th>Menu Options</th>
<th>Yes</th>
<th>No</th>
<th>N/A</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>16. Menu options are visibly displayed.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>17. Descriptive names are used for menu options.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

## Eating Area

<table>
<thead>
<tr>
<th>Eating Area</th>
<th>Yes</th>
<th>No</th>
<th>N/A</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>18. Tasteful wall art is displayed highlighting fun, food-oriented or physical activity health messages. (i.e. pictures of fruits and vegetables)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
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## Student Options**

<table>
<thead>
<tr>
<th>Student Options**</th>
<th>Yes</th>
<th>No</th>
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<th>Comments</th>
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<tbody>
<tr>
<td>19. Students are offered a choice between two entrees.**</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
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<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>21. Verbal prompts are used with students to encourage healthy choices.**</td>
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** Observation of 10 students should be made before answering items #19-21
Appendix F. Cafeteria Observation Form Answer Key

### School Cafeteria Observations Checklist

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#### Snack and a la carte

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