



Demographic Differences Affect Beverage Selection and Presence in Student Lunches

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Please note that this study was published before the SY2014-15 implementation of the Smart Snacks Nutrition Standards for Competitive Food in Schools, as required by the Healthy, Hunger-Free Kids Acts of 2010. As such, certain research relating to food in schools may not be relevant today.

Research Objectives

This investigation examined beverage selection by demographic variables in both lunches brought from home (LBFH), and lunches selected as part of the National School Lunch Program (NSLP).

Method

Digital photographs of lunches were taken before and after meals were consumed. The photos were used to make visual estimations of food items to determine nutritional content of meals selected and consumed. The nutrient content of 864 lunches from 560 students in four schools was determined and analyzed. Beverage categories utilized were: plain milk, flavored milk, 100% fruit juice, sweetened caloric beverage, or water/no beverage.

Results

Chi-square tests indicated significant ($p < 0.05$) differences in beverage selection by four demographic categories: sex, ethnicity, free/reduced status, and NSLP/LBFH. Males tend to select flavored milk, while females prefer caloric beverages or plain milk. Whites are more likely to have water/nothing or juice, while Hispanics are more likely to select plain milk. Free/reduced students tend to select flavored milk or plain milk; while paid status students tend to have water/nothing. Children eating NSLP lunches are more likely to select flavored milk or plain milk, while those with LBFH are more likely to have water/nothing (62% of LBFH), caloric beverages, or juice.

Application of Results

- Child Nutrition Professionals (CNPs) should provide guidance for parents and guardians wishing to send LBFH in order to help in selecting, and including, healthful and hydrating beverage meal components.
- CNPs are successfully providing and encouraging the selection of nutrient dense beverage options in NSLP meals.
- CNPs should be aware of possible demographic stigmas in selecting plain milk or flavored milk as the beverage component of students' lunch meals and are challenged to develop strategies for promoting healthful beverages.

Standards for Benchmarking Labor in School Meals Programs

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Research Objectives

This study measured direct value-adding labor at three preparation sites in two small school districts.

Method

Four casserole-type entrees prepared using similar recipes and ingredients were studied; all sites prepared the entrees in a one-pan method, mixing, cooking and serving the products in hotel pans in batches of about 20 to 25 portions per pan. Video recorded observations and individual interviews were used to determine the time required to complete production steps to prepare the entrees. Specific definitions for each step of production were determined based on recipes and video recorded observations. Video recordings were analyzed to determine time required to complete each step. Selected video recordings were validated by trained observers.

Results

Thirteen observations were completed. Production steps fell into five broad categories accounting for the majority of time in production: adding ingredients, covering/uncovering pans, measuring temperatures, moving product, and stirring. Comparison of mean times for each of the five major steps, as measured by the researcher and as validated, were not significantly different for stirring ($p = .620$) and moving product ($p = .945$). Proportions of production time spent on each step to produce studied entrees were determined.

Application of Results

This method identified standard times for completing specific steps required to produce casserole entrees using a specific production method. School districts employing the single-pan method of production may be able to identify labor required for each pan produced and to estimate more exactly the labor required to prepare entrees based.

Competencies, Knowledge, and Skills for State Agency Child Nutrition Professionals

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Research Objectives

The purpose was to identify the functional areas, competencies, knowledge, and skills needed by child nutrition (CN) professionals working in state agencies.

Method:

In Phase I, an expert panel of state agency professionals participated in a modified Delphi process to identify the functional areas encompassing job responsibilities of state agency CN professionals. In Phase II, a work group of state agency professionals met to arrive at consensus on job competencies and knowledge and skill statements needed for each functional area. Using an electronic survey, the Phase III review panel members were asked to verify the importance of the knowledge and skill statements to job responsibilities of state agency CN professionals; categorize the knowledge and skill statements into two distinct groups (when hired and advanced); and confirm whether the competency statements were consistent with the supporting knowledge and skill statements.

Results

Six functional areas encompassing job responsibilities of state agency CN professionals were identified: financial management; personnel management; program management; program and regulatory compliance; technology and data management; and training, technical assistance, and outreach. In addition, 24 competencies, 66 knowledge statements, and 104 skill statements were confirmed. The review panel identified 34 statements as needed when state agency CN professionals are hired and 136 statements as being advanced and gained through professional experience and training.

Application of Results

The functional areas, competencies, knowledge, and skills provide a clear picture of the complex role of state agency CN professionals. State agency directors can use this information to prepare job descriptions and evaluation criteria for state agency CN staff. These findings can also provide the foundation to design training programs for new staff and on-going professional development for all CN professional staff. The competencies, knowledge, and skills framework can provide the basis for mentoring and succession planning activities to prepare CN professionals for higher-level state agency responsibilities.

Comparison between Dietetic Students and Registered Dietitians: Exposure to School Nutrition

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Research Objectives

- Determine senior dietetic students introduction to school nutrition through undergraduate coursework compared to registered dietitians (RDs) in school nutrition leadership.
- Examine students' school nutrition interests and reasons for uncertainty about working in the field.

Method:

An online questionnaire was completed by senior dietetic students (N = 129) enrolled in 22 Academy of Nutrition and Dietetics accredited universities in the Southeast United States Department region. A second online questionnaire was distributed to RDs in school nutrition leadership roles (N = 158) in the same region. Frequencies were calculated and comparisons were made between student and RD responses.

Results

The majority of student participants reported they strongly agreed (16%) or agreed (44%) that coursework provided information about school nutrition management positions. In contrast, only 25% of RD participants reported they strongly agreed (5%) or agreed (20%) that undergraduate coursework introduced school nutrition. Results indicate a potential increase in student exposure to school nutrition. Students indicated being unsure about working in school nutrition because of limited job responsibility knowledge (49%), uncertainty about foodservice management interest (64%), unsure of how to apply for position (10%), not knowing an RD working in this field (17%), desire to work in clinical setting (33%), and wellness interests outside of school environment (51%). Unfortunately, only 10% of participating students reported consideration of school nutrition field, while 21% reported no interest, and 3% reported not knowing anything about school nutrition, while 66% indicated that they may consider this field.

Application of Results

Results demonstrated senior dietetic students appear to have greater school nutrition exposure compared to students in the past. However, students perceived that they had limited know ledge about specific job responsibilities and were unsure about working in school foodservice management. RDs have qualifications making them effective school nutrition leaders, but limited exposure in undergraduate coursework may not present this as a career option.

Qualitative Study of Factors Influencing Farm to School Participation in Mississippi

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Research Objectives

Nutrition education provided by Farm to School (F2S) programs may increase fruit and

vegetable preferences in children. While F2S programs are becoming increasingly popular, there is still much to be learned about the factors that motivate schools to adopt F2S. The goal of this qualitative study was to investigate multiple stakeholders' perspectives of benefits and barriers to implementing F2S programs.

Method

Structured phone interviews were conducted with Child Nutrition Program (CNP) directors and small farmers (those grossing more than \$2,500 but less than \$250,000 annually). Two sets of interview questions unique to profession and adapted from previous F2S evaluations were utilized. Responses were digitally recorded, transcribed, and thematically analyzed.

Results

After interviewing small farmers (n= 5) and CNP personnel (n=10) from across Mississippi, several factors that influenced implementation and participation in F2S programs were noted. Only three CNP directors reported purchasing goods from local farmers directly or through the state purchasing cooperative. Most cited reasons for not purchasing directly from local farmers included a perceived lack of local farmers and food safety certification concerns. Farmers reported not selling to local schools because of an inability to produce enough goods to supply schools and having no means to package and ship produce to schools. Helping local farmers and the local community/economy were found to be the leading benefits participation by CNP directors. The most cited benefit by farmers for selling produce to schools was providing students with fresher foods than could be obtained from a large distributor.

Application of Results

In general, CNP directors seemed to be open to purchasing locally grown produce directly from farmers. Increasing F2S participation could have a significant impact on the health of children in Mississippi. F2S program implementation should continue to be evaluated as we seek to strengthen the economy and improve healthy dietary preferences in schoolchildren

Greening the School Nutrition Scene! A Research-based Guide for Implementing and Sustaining Green and Environmental Conservation Practices in Schools

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Research Objectives

The purpose of this study was to identify and confirm green/environmental conservation (GEC) practices for successful implementation and sustainability in school nutrition (SN) programs. The information from this study was used to develop a Web-based resource for SN and school professionals.

Method

This research study was conducted in two phases. In phase I, an expert panel of SN

professionals, school administrators, and state agency representatives with experience implementing and evaluating GEC programs identified and confirmed GEC statements that were identified as sustainable practices in SN programs and schools across the country. The expert panel also provided recommendations for the design of a resource for SN and other school professionals. Researchers used the information from the expert panel to format a draft resource that was reviewed by SN professionals, school administrators, and state agency representatives. Recommendations from the review panel were used to revise the draft resource.

Results

The final resource, *Greening the School Nutrition Scene! A Guide for Developing and Sustaining Green/Environmental Conservation Practices for School Nutrition Professionals*, contains two sections. In Section I, the assessment tool contains four sub-sections that can be used to identify preliminary actions to establish or evaluate 73 GEC practices, identify and define roles for key stakeholders, and review information to create GEC policies and plans. Section II contains seven steps or categories with 59 action statements that could be used to support the achievement of sustainable GEC practices and programs. The resource also includes instructions for its use, key definitions, and resource citations to assist SN and school professionals and is available on the NFSMI Website.

Application of Results

Greening the School Nutrition Scene! A Guide for Developing and Sustaining Green/Environmental Conservation Practices for School Nutrition Professionals could be used by SN professionals and school personnel to assess potential GEC practices prior to implementation or evaluate current practices in school settings. The resource could also be used to identify internal and external stakeholders, assess resources needed for implementation, and identify training needs and approaches that are needed to support sustainable GEC practices.

Pilot Study – The Impacts of Removing Flavored Milk from Elementary School Menus

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Research Objectives

- To examine the impacts of removing flavored milk from school breakfast and lunch menus.
- To measure daily meal participation in the NSBP and NSLP before and after the elimination of flavored milk from the menu.
- To measure total milk consumption before and after the elimination of flavored milk from the menu.

Method

This pilot study was initiated at two schools and repeated at two additional schools (happening currently). Meal participation prior to and after elimination of flavored milk was measured and also compared to counts from the same time period in the previous year. Milk purchases were used as a proxy for milk consumption. Meal participation numbers were compared to milk purchases to estimate the percentage of students who

participated in the meal programs and selected milk.

Results

The preliminary study (first two schools) indicated that both breakfast and lunch participation were unaffected by the removal of flavored milk; however, total milk consumption decreased. School 1 - 30% decline in students taking milk with meals. School 2 - 39% decline in students taking milk with meals.

Application of Results

The catalyst for initiating this study was a city-wide collaboration aimed at decreasing childhood obesity through the promotion of a preventive health message, which included the recommendation of consuming no sugar-sweetened beverages. These study results indicate that there are unintended consequences of removing flavored milk from school meals including a decline in overall milk consumption. Both flavored and unflavored milk contain several nutrients of concern according to the Dietary Guidelines for Americans 2010. Following the first phase of the study, flavored milk was eliminated from the breakfast menu throughout the district. Findings will be presented to district administrators and local committees in order to present objective information about the implications of removing flavored milk. It will be up to the school board to decide whether or not to remove flavored milk from lunch district-wide next year.

Research Priorities in School Foodservice

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Research Objectives

School foodservice operations in the U.S. serve about 32 million meals daily through the National School Lunch program. The Child Nutrition Reauthorization Act of 2004 required that schools implement food safety programs based on Hazard Analysis Critical Control Point (HACCP) principles, which are an effective way to reduce foodborne illnesses. Previous research has identified barriers to implementing food safety and HACCP programs, and the general status of food safety in schools. However, to maintain and improve food safety practices in schools, research efforts should include insight from practitioners in the school nutrition environment. Prioritized research needs serve to connect the practices, science, and applications of food safety.

Method

A Delphi technique and survey methodology was used in this study. In the first phase, a questionnaire with five open-ended questions about food safety issues was distributed to 50 school nutrition professionals including school foodservice directors, consultants, and state directors. Three researchers conducted a triangulated review of the qualitative data to identify general and sub-themes based on comments with the highest frequency of occurrence. Emerging themes from the first phase of research were reformatted into a follow-up questionnaire and distributed to the same sample of professionals. Finally, respondents were asked to rank research topics, from most to least important.

Results

Both phases of the study yielded a strong response rate, 40 and 38 completed surveys, respectively. Data analysis for the first phase revealed the following food safety challenges and research needs: employee training and behavior change, food temperature control, customized HACCP plans, outdated equipment and facilities, and cross-contamination with students and food bars. In phase two, respondents ranked research about employee behavior change as the most important topic.

Application of Results

The results from this study provide insight about research priorities in school foodservice and provide guidance for future research. The results will also help to advance existing knowledge about food safety training opportunities in school foodservice.

Impact of New USDA Meal Pattern in Six Midwestern School Districts

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Research Objectives

The Healthy, Hunger-Free Kids Act of 2010 called for new meal patterns, and on July 1, 2012 new meal pattern regulations for school lunches went into effect for the 2012-2013 school year. The regulations require increased availability of fruits, vegetables, and whole grains and food-based menu planning. The purpose of this study was to explore the impact of the regulations in six Midwestern school districts.

Method

Using case study research methodology and researcher contacts in Michigan, Ohio, and Indiana, six districts of varying sizes and varied levels of free and reduced price eligible students were visited. Interviews based on systems theory were conducted with school nutrition directors and managers. Lunch was observed in one school per district; additional school personnel were interviewed, and financial data was analyzed.

Results

Six directors from rural, suburban, and urban districts with enrollment ranging from 2,711 (5 schools) to 17,091 (39 schools) were interviewed. Directors and managers reported successes as menus that were more appealing and students trying new foods. Barriers included menu acceptance by older students, cost of fruits and vegetables, increased production time for fruits and vegetables, acceptance of whole grain menu items, and staff training. The impact of the new meal pattern on food costs and lunch participation was mixed. From 2011-2012 to 2012-2013, three districts had increased food costs and three directors had decreased food costs. Lunch participation dropped in four districts, stayed the same in one district, and increased in one district.

Application of Results

Directors and managers are positive about serving more fruits, vegetables, and healthy foods. They are proud of their appealing and nutritious lunch offerings. However, the

regulations have led to challenges in menu planning and cost control. Financial management is a concern. The outcomes of this study should be shared with school nutrition personnel, school administrators, teachers, school staff, and parents.

Food Safety Practices in Childcare Centers in Kansas

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Research Objectives

The purpose of this study was to explore the food safety knowledge, practices, and barriers to safe food handling practices of childcare center employees. Specific research questions explored were:

1. What is the food safety knowledge of employees in childcare centers?
2. Do employees in childcare centers follow proper food handling practices in the kitchen and classroom to assure safe food is served to the children?
3. What food safety training is provided to childcare center employees?
4. What are the barriers to safe food handling practices in childcare centers?

Method:

The population for this study included all childcare centers in Manhattan, Kansas; a convenience sample was chosen for participation. Observations were conducted in the kitchen for foodservice employees and in the classroom for teachers. Kitchen observations utilized a food safety observation form based on previous research. This observation form contained general food safety practice items, including hand washing, employee food handling, cleaning and sanitizing work surfaces, and overall facility condition. The observation form was reviewed by three experts who are experienced with food safety for content validity. Classroom observations were recorded in descriptive details and later analyzed. Childcare center directors were contacted to solicit their participation in the study. Each childcare center was observed during lunch hours for two days during a typical workweek (Monday through Friday). The observation period ranged from 6 a.m. to 1:30 p.m. Observations of foodservice employees' food handling behaviors and preparation in the kitchen began when foods were being prepared in the kitchen and ended when food was delivered to the classrooms. Observations of teachers' food handling behaviors began when the food arrived in the classroom and continued until the majority of the children finished their lunches. At the completion of the observation period, employees were asked to complete the questionnaire that addressed demographic and food safety training information. A short assessment of food safety knowledge was also included in the questionnaire. SPSS (v.20.0) was used to analyze data. To summarize the data, descriptive statistics including frequencies, percentages, means, and standard deviations were calculated for observation and questionnaire items, as appropriate. Comments, open-ended questions, and notes were compiled and sorted into groups.

Results

Ten childcare centers agreed to participate in the study. Observations were conducted for two days during lunch, resulting in 20 total observations. A total of 19 employees, 13 foodservice workers and six teachers, completed the questionnaire. For foodservice workers, the average score of food safety knowledge was 43.3 ± 7.2 out of 54, while teachers scored slightly lower at 42.5 ± 7.0 out of 54. Scores showed that both foodservice workers and teachers have good knowledge of food safety. Thirteen foodservice workers' hand washing and food handling behaviors, work surface cleaning and sanitizing, and facility observations were recorded. A total of 291 hand washing observations were recorded. Foodservice employees only washed hands properly and when required 87 times (29.9%) during food preparation. Fifty-four (18.6%) of the observations showed that employees improperly washed their hands. Results of employee food handling practices showed over half of the employees checked the internal temperature of food correctly (19 of 28) and correctly checked temperature at the completion of reheating (7 of 13) and cooking (5 of 9). Employees complied with proper bare hand contact with ready-to-eat food in only 8 of 31 observations. Related to cleaning and sanitizing work surfaces, all facilities changed sanitation solutions during observations. Most (32 of 44) food contact surfaces and utensils were clean to sight and touch and sanitized before use. Facility observations noted that the majority (17 of 21) of the hand washing facilities were conveniently located and accessible and most (18 of 22) were supplied with hand cleanser and disposable towel/hand drying devices. None of the childcare centers had evidence of pests during the observation periods.

Application of Results

Limited studies have explored childcare center employees' food handling practices. This study provided baseline data of childcare center employees' food safety knowledge, food safety practices, and barriers to safe food handling through food safety assessment and structured observations. Because young children are at a higher risk of contracting foodborne illnesses, directors and managers should pay special attention to ensure that foodservice employees and teachers handle food safely. Food safety assessment and observation forms used in this study could be applied by childcare educators and providers to examine their employees' food safety knowledge and food handling behaviors. The results should help the educators and providers learn how their employees perform on food safety knowledge and if they practice safe food handling. Further training and intervention could be established based on the results.

School Foodservice Directors Food Recall Attitudes and Behaviors

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Research Objectives

The purpose of this study was to explore school foodservice directors' attitudes and

behaviors about food recalls. Specific questions included 1. What attitudes do school foodservice directors have about food recalls and handling food recalls within their school or district; 2. What are school foodservice directors' level of confidence in responding to a recall; and 3. How many school foodservice directors are registered for Recalls.gov, FoodSafety.gov, and the USDA/FNS Commodity Alert System?

Method:

The population for this study included school foodservice directors in the United States. The sample was drawn from MDR™ to obtain a random, national sample. The survey instrument consisted of three sections: attitudes, behaviors, and demographics. To measure content validity of the entire survey, three experts were asked to examine the questions on the survey. Feedback was also gathered from the USDA FNS Office of Food Safety staff. Their comments were collected and analyzed before pilot testing began and the survey instrument was modified based on their feedback. After Institutional Review Board approval was granted, a pilot study was conducted. Responses were obtained from 14 school foodservice directors and state agency personnel (approximately 47% response rate). Internal consistency of the attitude items were measured; the respective Cronbach's Alpha for each variable was found to be reliable (≥ 0.70). No questions were removed from the survey, although some questions had minor wording modifications based on suggestions of the respondents. The sample for this study consisted of 3,700 school foodservice directors, anticipating a 10% response rate. Survey Monkey™ was used for survey design and data collection. MDR™ was contacted for sample generation and survey distribution. MDR™ sent an email that included a cover letter with a survey link to all school foodservice directors who had been randomly selected to participate in the study. A 10-business day window for completing the survey was given. During that time, one reminder was sent to all initial participants one week following the initial email. All statistical analysis was completed using SPSS (v. 20.0). Descriptive statistics were calculated for all survey items. Frequencies, means, and standard deviations were calculated for attitudinal and behavioral items. Frequencies were calculated for all demographic information.

Results

A total of 567 surveys were usable (17% response rate); of these 467 (84%) were female. The size of school districts ranged from 85 to 225,000 students, with 6,108 students on average. Most directors had positive attitudes about food recalls. Approximately 92% of directors strongly agreed that responding quickly to a food recall is important to protect children in their district. Most (80%) directors strongly agreed that it is important to monitor recall notifications; however, many strongly disagreed when asked how likely it would be for a recalled product to be in their school's food inventory. Approximately 89% of school foodservice directors' were mostly confident or very confident that their district could adequately respond to a food recall, and 79% indicated their district has appropriate policies/procedures in place to respond to a food recall. However, the majority of directors (61.6%) would rather throw away all product of a certain type than risk serving a recalled product. Approximately 77% of respondents reported to have received a recall notification directly from the vendor and 86% from their state agency. Few directors utilized food safety recall systems (Recalls.gov or

FoodSafety.gov). While 55% regularly or very often utilize these systems, 23% indicated that they seldom or never do. Open-ended questions were evaluated to explore the positive and negative opinions about current food recall practices. Directors stated communication with their state agency, vendor, other districts, and school nutrition staff worked well. Directors preferred to know only the information that was pertinent to them and would prefer that it is sent directly to them. Email notification was stated as being the fastest, with timeliness being stressed. Other methods included a follow-up phone call, a phone app, text message, or automated phone message. Several suggested that there should be one system for delivering all recall notification to schools.

Application of Results

This study further illustrates the need for more training for school foodservice directors related to food recalls and product management within the district. A large number of directors would rather throw away all product of a certain type rather than risk serving a recalled product. Almost half of directors had not been provided training from the state or annual in-service training on food recalls or inventory management. Frequent training is needed that specifies inventory management practices and how to identify trace back information. Increased training about recalls and inventory management would improve recall awareness, knowledge of how to find recall information, and inventory practices. Federal and state agencies can use the results of this study in developing programs to improve food recall practices. Most school foodservice directors prefer to learn about food recalls from the state agency through email or telephone and from vendors through email or telephone. Notification through email followed by a phone call should be used more prevalently. The USDA/FNS Commodity Alert System should be emphasized in training as a reliable way of receiving recall notifications on USDA Foods. An email from FoodSafety.gov or Recalls.gov and press releases from the manufacturers are slightly less preferred, though are a reliable way of sending information without the time and resources of more personal routes of communication.

The Positive Impact of School Health Environment Changes through the Implementation of School Wellness Grants

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Research Objectives

This study examines whether implementing school wellness initiatives such as summer feeding programs, breakfast programs, competitive foods programs, and access to healthy foods programs that are focused primarily on school wellness policies, programs, and practices can lead to increasing students' access to healthy foods and students' knowledge, attitude, and behaviors concerning nutrition, and also help to improve the overall school health environment.

Method

In the spring of 2012, schools in 20 select states (CA, CO, CT, DC/MD/VA, FL, GA, IL,

KY, LA, MA, MI, MN, MS, NC, NJ, NY, OH, PA, TX, WA) that participated in the United States Department of Agriculture's National School Lunch Program with a 50% or greater free and reduced meal eligibility rate could apply for the AFHK – School Grants for Healthy Kids, in the amount ranging from \$1,000 to \$5,000, to implement policies, programs, and practices aimed at improving school wellness environments that lead to increasing students' access to healthy foods and students' knowledge, attitudes, and behaviors concerning nutrition. School wellness programs selected included an individual program or combination of programs focused on summer feeding programs (on site or through community partnerships), breakfast programs (including traditional breakfast, alternative breakfast models such as breakfast in the classroom or grab and go breakfast, and universal breakfast), competitive foods programs (including improvements to a la carte items, healthy fundraisers, and healthy classroom celebrations or incentives), and access to healthy foods (including taste testing, school salad bars, and school gardens). Data collection obtained throughout the school grant cycle included key informant interviews, student surveys, school wellness environment pre and post surveys, midterm and final report findings. The collected surveys and reports were analyzed for overall impact of the school health environment and students' knowledge, attitude and behaviors concerning nutrition.

Results

Over 1,700 schools applied for the school grant opportunity with approximately 400 schools awarded mini-grants in key states, reaching over 276,000 students nationwide. The impact of the school wellness programs, policies and practices are outlined below.

- 80 schools implemented an alternative and/or universal breakfast program and realized an increase in average daily participation by 90%, yielding 2,723,673 new breakfast meals to an additional 15,131 hungry students;
- 18 schools implemented enhanced Summer Feeding Programs either providing more children with meals at current sites, or expanding to additional sites, yielding 4,781,750 meals to over 51,560 students;
- 20 AFHK – Get in the Action community events held in Shining Star schools saw over 12,800 students, parents, community members, and school representatives in attendance;
- Student survey results included positive behavioral changes including:
 - 89% of surveyed students stated their school made it easier to eat more fruits and vegetables;
 - 66% of surveyed students stated their school made it easier to switch to fat-free or low -fat (1%) milk;
 - 80% of surveyed students stated their school made it easier to drink water instead of soda, sports drinks, energy drinks, sweet tea, and kool-aid;
 - 89% of surveyed students stated their school made it easier to eat breakfast every day.
- Key informant interviews with Champions at each of 20 Shining Star Schools yielded the following themes as effective school wellness interventions:
 - Partnering with organizations with existing relationships;
 - Collaborative School Wellness Team work;
 - Involvement and buy in from key stakeholders, including principals, teachers, and

- students;
- Incorporating nutrition education into teacher lessons or already existing opportunities;
- Conducting taste tests for students and parents;
- Recruiting volunteers to assist with any program implementation;
- Incorporating more focus and awareness of school wellness policies;
- Utilizing grant funds to support school wellness efforts.
- Based on results from a pre/post survey completed by schools, there was an increase in the percentage of schools reporting implementation of the following school wellness team activities including participation on school wellness teams of:
 - Health education teachers (from 60% to 66%);
 - Parents or families of students (from 51% to 59%);
 - School administrators (from 85% to 88%);
 - Student body (from 33% to 37%).
- Based on results from a pre/post survey completed by schools, there was a significant increase in the percentage of schools reporting implementation of the following school wellness team activities:
 - Regular meetings (from 51% to 69%);
 - Promotion of nutrition and physical activity initiatives (from 57% to 72%);
 - Hosting a nutrition event (from 47% to 70%) or physical activity event (from 49% to 61%);
 - Communicating w wellness activities to parents and/or community (from 58% to 70%);
- Based on findings from a pre/post survey completed by schools, there was a significant increase in the percentage of schools reporting implementation of the following:
 - Limiting food sales for fundraising or promoting/requiring healthier options for fundraising (from 49% to 60%);
 - Setting nutritional guidelines/ standards for all foods sold, served, or shared at school (from 51% to 64%);
 - Increasing and promoting healthy food choices offered for school meals and/or before or after-school programs (from 89% to 94%);
 - Providing information to students or families on the nutrition and caloric content of foods available (from 57% to 71%);
 - Conducting taste tests to determine food preferences for nutritious items;
 - Connecting the cafeteria to the classroom for nutrition education, food safety, food preparation and other nutrition related topics (from 62% to 86%);
 - Permitting students to have a water bottle with them during the school day (from 68% to 75%);
 - Offering a free source of drinking water in the cafeteria during meal time (from 81% to 87%);
 - Introducing programs to educate families about nutrition and physical activity in the home environment (from 58% to 72%);
 - Increasing opportunities for physical activity in the classroom (from 55% to 63%);
 - Increasing recess time (from 17% to 23%);
 - Improving the quality of recess time (e.g., structured recess, recess in action);

- Improving the quality of physical education classes (from 23% to 29%);
- Providing information to students or families on recommendation for students to get sixty or more minutes of physical activity per day (from 57% to 73%).

Application of Results

Research focused on overall school wellness has shown that schools that offer students an increase in healthy food options and more time to be physically active are seeing increasing fitness levels in students, better student behavior, higher test scores, and higher graduation rates. Schools that offer students increased access to healthy food options and also provide increased physical activity result in equipping students for both improved health and academic success. Students in turn that do not eat nutritiously and participate in regular physical activity are at an academic disadvantage. Child nutrition professionals and school wellness teams can implement innovative school wellness initiatives that promote healthy food options and nutrition education that are provided through summer feeding programs, breakfast programs, competitive foods programs, and access to healthy foods programs such as school gardens or school salad bars, which can positively improve the overall school health environment and increase students' knowledge, attitudes, and behaviors concerning nutrition. The implementation or expansion of these school wellness policies, programs, and practices can be supported through grant funds such as those provided through AFHK school wellness grants, help to sustain the change of creating a healthier school food environment and equipping students for improved academic achievements.

Farm-to-School: Identifying Applied Research and Operational Resource Needs

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Research Objectives

Explore and identify applied research needs associated with school nutrition (SN) programs' engagement in Farm to School (F2S) initiatives

Method

The methodology for this qualitative study included a literature review, two site visits, and an expert panel. Information gain from the literature review was used to select SN program sites to visit. The expert panel consisted of 14 SN directors and two state agency representatives with experience implementing a FTS initiative within the past 10 years. Data from the two site visits and the literature review were used to create discussion topics for the expert panel. The parameters of the discussion topics were challenges and barriers associated with implementing, sustaining, and expanding a F2S program. Transcripts from the expert panel were analyzed and organized to meet the objectives of the study.

Results

Results suggest there are four primary areas that create challenges for school nutrition directors when implementing a Farm-to-School (F2S) program: procurement, general knowledge about farming and F2S, finances, and food processing/cooking. Expert panel members indicated the primary barriers to sustaining a F2S program were identifying and gaining the support of community stakeholders. Barriers to expanding a F2S program included: finding suppliers to meet expanded needs, providing F2S education to students, finding time to plan the F2S program expansion, and dealing with food safety issues.

Application of Results

The results of this study indicate several resources and research studies would support school nutrition directors interested in implementing, sustaining, and expanding a F2S program. Examples of F2S resources included: a F2S procurement guide, F2S food specifications, a resource that identifies potential grants for F2S programs, standardized F2S recipes, and a guide for marketing F2S programs. Examples of F2S research included measuring the impact of F2S programs on academics, student participation, and student satisfaction.

Practices and Perceptions of School Nutrition Professionals toward Obtaining the HealthierUS School Challenge Award

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Research Objectives

The purpose was to explore the impact of obtaining the HUSSC award on school nutrition (SN) programs. The objectives were to identify practices, perceptions, and barriers to obtaining the award.

Method

The methodology included two site visits to SN program award recipients, one expert panel of SN professionals with successful experience applying for HUSSC awards, and an online national survey to SN directors in programs that received a HUSSC award (N=266). Statistical analysis included means, standard deviations, frequencies, one-way ANOVAs, and T-Tests.

Results

The response rate for the survey was 54% (n=139). Survey results provided insight into the practices, perceptions and barriers of SN professionals that have received HUSSC awards. Bronze was the most frequently received HUSSC award (56.8%). A little less than half (43.2%) of respondents reported they would not be applying for a higher level HUSSC award, and the most frequent reasons given were “currently have the highest level award” (40.9%) and “student participation” (38.6%). Most recipients agreed that

“the HUSSC award status increases recognition among other SN programs” (3.51 ± 0.58); however an “increase in cost” (3.13 ± 0.72) for SN programs and the “application processes” (3.07 ± 0.74) were commonly cited as perceived barriers to obtaining a HUSSC award.

Application of Results

The results of this study provided several common practices for SN directors to consider when engaging in the HUSSC application process. Those practices include the following: apply for the bronze before seeking higher awards; do not try to achieve HUSSC awards for every school in a district at one time; expect the application process to take anywhere from two to seven months; create a HUSSC team and plan for the SN director to be the team leader; and consider core curriculum classes, physical education classes, and testing activities when looking for venues to provide nutrition education.

Exploring School Nutrition Professionals' Preferences of USDA Recipes for Meeting New Meal Pattern Requirements

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Research Objectives

The purpose of this research was to explore school nutrition (SN) professionals' perceptions, preferences, and needs pertaining to USDA recipes.

Method

The methodology included a literature review, an expert panel, and a national survey. The expert panel consisted of seven SN directors and two state agency representatives with experience utilizing and modifying USDA recipes. The discussion topics for the expert panel were based on the research objectives. The expert panel discussions were utilized to develop an online survey. The survey was sent to a random stratified sample of 2,100 SN directors representing all USDA regions.

Results

The survey response rate was 23.4%. The majority of the responding school nutrition (SN) directors (75%) indicated they use USDA recipes in their SN programs. Of these respondents, 64% indicated that USDA recipes are modified as necessary to meet their needs. The largest percentage of SN directors used USDA main dish recipes one or more times per week (46%), while only 6% used USDA dessert recipes one or more times per week. More than one half of SN directors who used USDA recipes rated them as “good” regarding “ease of modification,” while 23% indicated that USDA recipes were “poor” for meeting the trends of today. Beans and peas (62%) and dark green vegetables (60%) were the meal pattern components most often identified as needing new recipes developed. Reasons most frequently provided as to why SN programs do not use USDA recipes were “we have other recipes we prefer” (47%) and “the USDA

recipes are not current with today's trends" (40%).

Application of Results

The results of this study can be utilized by the USDA to modify current recipes and develop new recipes to meet better meet the needs of school nutrition professionals.

Promotional Signs and Verbal Prompts Modestly Influence Selection but Not Waste of Lunch Vegetables among Middle-School Students

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Research Objectives

Determine how promotional signs and verbal prompts affect middle school student selection and consumption of lunch vegetables items.

Method

For this year-long project, 2 of 4 district middle schools (grades 6-8) were randomly assigned as either treatment (TS) or control schools (CS). In the fall of 2013, TS received new tray line signs with student-suggested creative names and photographs specific for each vegetable item on the menu. In the following spring, cafeteria staffs added a verbal prompt, asking students without vegetables on their tray if they would like fresh or hot vegetables. Daily vegetable servings per meal data were obtained from food production records. Percent vegetable waste, estimated to the nearest 10%, was measured once per month in each school using digital photography of student trays. Analysis of variance was used to determine differences in the average vegetable servings per meal and waste pre and post intervention and between schools.

Results

There was no change in vegetable servings per meal in TS, but a significant decrease occurred in CS ($p < 0.03$). When vegetable servings were examined by type (fresh versus hot), per meal fresh vegetable servings significantly increased in one TS ($p < 0.001$). Students in both TS and CS wasted more than 50% of vegetables selected. Also, 6th- and 7th-grade students wasted significantly more vegetables than 8th-graders ($p = .0002$, $p = 0.02$ respectively). Vegetable waste decreased 6% in TS and 7% in CS over time and the difference between TS and CS was non-significant.

Application of Results

Due to simplicity and low cost, subtle environmental changes such as adding signage and staff prompting vegetable selections make attractive options for encouraging students to take and eat more vegetables with lunch. This study showed middle school students may respond to subtle changes designed to encourage selection of vegetables. However, other strategies may be necessary to achieve an increase in vegetable consumption.

What Do Kids Eat? A Plate Waste Study

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Research Objectives

As part of a larger study investigating impacts of recess schedule (before or after lunch) multiple assessments of third grade students' plate waste from lunch trays and milk consumption were conducted.

Method

A convenience sample of three elementary schools in Iowa from districts with small, medium, and large enrollments was used. Data was collected at each school on two days featuring the same menu in fall when recess was scheduled after lunch, and on two days at each school in spring when recess was held before lunch service, for a total of 12 data collection occasions. Photos were taken of each lunch tray at point of sale and at tray return with comparisons of digital images assessed using a 1 – 5 rating (1 = no product remaining; 5 = $\frac{3}{4}$ or more) for amount of waste by each meal component. Waste on returned trays was weighed and subtracted from weight or measure of portion served. The volume of fluid milk sold not consumed was measured. Mean ratings of observed waste and mean weights for each meal component were calculated for all schools when recess was held after and before lunch.

Results

Results of waste by meal components from when recess was scheduled after lunch were fairly consistent between schools. Visual observation summaries for mean meal components' waste ranged from 4.19 (vegetable) to 1.24 (cookie). Actual plate waste ranged from 10% (for cookie) to 75% of serving for vegetables. Mean fluid milk waste ranged from 19% (chocolate flavor) to 57% for white milk. Data collection of plate waste when recess is scheduled before lunch is currently in progress.

Application of Results

Few studies have tracked plate waste by meal component. Data was collected after introduction of new nutrition standards; thus findings will address concerns related to waste. Data will provide for informed decision making by foodservice and other school administrators about menus and recess schedules.

Food Adventures -- A Pilot Study

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Research Objectives

Young children in the US consume less than half the minimum recommendation for vegetable servings. Children in Berkshire County in Western, MA, are following this national trend of low vegetable intake and above average rates of children who are overweight or obese. There is a need in this region, which is designated as a medically under-served area as well as a food desert, for preventative, community-based health programs such as educational and interactive cooking classes for children which promote an increased intake of fruits and vegetables and cooking confidence leading to positive health outcomes. Food Adventures (operated through The Nutrition Center located in Pittsfield, MA) is a standards-based, culinary program that uses a curriculum designed to engage, educate, and inspire students to learn about nutrition and healthy food choices in a fun, collaborative, hands-on environment. Students who have exposure to the Food Adventures program eat more vegetables and are more likely to try new foods, learn to read nutrition labels, and prepare healthy meals at home with their families.

Method

From 2009 -2013, more than 1,000 Food Adventures classes were delivered to Berkshire County school children. Several video interviews with children and 455 feedback surveys from students ranging in grades from pre-kindergarten through 10th, and 20 feedback surveys from teachers for those same grades (using 1 poor – 5 exceptional, Likert-item scale) were gathered to initially evaluate the program's effectiveness.

Results:

Eighty-eight percent of children enjoyed Food Adventures, despite 63% indicating that they were 'somewhat unlikely' to try new foods (57% said 'yes' and 36% were 'unsure'). Sixty seven percent indicated that they would eat the novel foods again, and 57% would make Food Adventures recipes at home. All of the classroom teachers found that the Food Adventures program content was appropriate for the grade level [Likert-item scores of 4 (5%) or 5 (95%)], was in-line with common CORE standards in subjects such as science, health, math, language and culture, and helped students understand food preparation and nutrition [4 (20%) or 5 (80%)].

Application of Results

The Nutrition Center is using preliminary results of this pilot study to engage more students and school districts in Food Adventures classes and to raise awareness about the program among elected officials, business owners, educators and the community. The Nutrition Center is also taking this study and its methods into the community where we conduct cooking classes for adults. Results of this pilot survey will promote awareness within the community about food insecurity and about creating a healthier food pantry model where nourishment of families is a priority. We are proposing that Food Adventures is an ideal model to help schools deliver healthy curriculum and introduce concepts in nutrition and health as schools enact mandates on improvements to qualify for food services in school cafeterias and a la carte venues on school

grounds.

Nutritional Contribution of Snacks and Sweets to Elementary School Lunches

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Research Objectives

The study investigates the prevalence of snack foods in elementary school students' lunches by gender and ethnicity. The nutritional contribution of snack foods to the meal was calculated for lunches brought from home (LBFH) and National School Lunch Program (NSLP) lunches.

Method

Digital photographs were taken of 437 LBFH and 427 NSLP lunches for a total of 864 lunches from four schools, both before and after the meals were consumed. Food items found in the snacks and sweets category of the What We Eat in America (WWEIA) national food survey were identified as snack foods. Nutrient content was estimated from the digital photographs, with foods selected and foods consumed considered separately.

Results

LBFH are more likely to include snack items than NSLP lunches. When considering LBFH and NSLP lunches separately, black students are more likely to have more snacks than white, Hispanic or Asian students. No difference in the number of snacks in lunches between males and females were found when considering LBFH and NSLP lunches separately. Additionally, students eligible for free or reduced priced lunches are less likely than students paying full price to have a snack item. As a percentage of nutrients selected and consumed, snack items contribute significantly more ($p < 0.05$) calories, total fat, saturated fat, carbohydrates, protein, calcium, cholesterol, sodium, and vitamin A to LBFH when compared to NSLP lunches.

Application of Results

Child Nutrition Professionals (CNPs) can guide parents and guardians wishing to pack lunches from home helping them select the best meal items contributing to their children's nutrient needs. CNPs may use the information to tailor educational material to the student's gender, ethnicity and pay status. Children bringing lunches from home could be encouraged to select fruits or vegetables rather than snacks and sweets.