

## CHILD NUTRITION SHOWCASE RESEARCH POSTERS

### *Key Performance Indicators for Use as Benchmarking Tools for School Nutrition Programs*

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**Background:** Recent changes in school nutrition (i.e. popularity of after-school meals, snacks, alternative breakfast) directly affect the productivity benchmarking for school nutrition programs participating in the National School Lunch Program. Local school districts often feel the need to operate more efficiently while increasing the quality of school meal programs. Key performance indicators (KPI) are used in measuring performance and productivity.

**Objective:** The purpose of this research is to describe the current use of KPI's and determine if current trends, initiatives, and changes in school nutrition regulations have affected accuracy in measuring performance and productivity.

**Design:** Data including average daily participation for breakfast and lunch, total employees (full and part – time, temporary), and hours worked from August through November of 2018, were collected from 53 rural schools in the state of Arkansas. Meal equivalents were calculated and used to determine meals per labor hour (MPLH).

**Results:** Meals per labor hour consistently increased for most schools from August through November. Ranges for MPLH were from 5 – 30 where schools using more prepared food and satellite type outlets had higher MPLH values.

**Conclusions and Applications:** In this study, some MPLHs were excellent (i.e. 30 MPLH) but some disappointing, even given the type of foodservice and meals prepared (i.e. 5 MPLH). According to industry guidelines, there are several schools where productivity is lacking. The cause of these findings remain under scrutiny, as essential KPIs may be outdated given the number of additional meals and serving types that are available in schools. However, data could have been misreported if managers did not understand what values to report or if they are not using these values as standard metrics. Further research will examine other KPIs and use a case study approach to evaluate the outlier schools and how their meal production and distribution is performed. Regardless, school nutrition professionals should be aware of the importance and benefit of using KPIs, especially MPLH. Training could include these benchmark tools and standardization of calculating meal equivalents based on types of service.

## *Professional Standards and District Directors' Qualifications*

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In 2015, USDA established Professional Standards to ensure that school nutrition professionals have adequate knowledge and training to operate school meal programs. This study examines data from the CDC's School Health Policies and Practices Study to determine whether qualifications of district directors changed following the publication of the Professional Standards and whether they differ by district size. In 2012, 48.5% of districts had a director with a degree in nutrition or a related field and 6.3% had a director with a RD, compared with 56.6% and 8.7% of districts in 2016, respectively. In 2016, 41.1% of small, 76.5% of medium, and 89.1% of large districts had a director with a degree in nutrition or a related field. The findings suggest that small districts lag behind their larger counterparts in terms of relevant education. Additional resources may be necessary for small districts to recruit school nutrition personnel with comparable qualifications.

## *Using Digital Photography to Estimate Dairy Consumption in Students*

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**Introduction:** Dairy foods provide many essential vitamins and minerals and are a key component in meals served as part of the National School Lunch Program. The purpose of this study was to evaluate milk/dairy consumption in a sample of elementary school children participating in the National School Lunch Program.

**Methods:** Digital food photography was used to evaluate dairy consumption over two school days in fourth and fifth grade students at six different rural and urban schools. Students were given identification cards and asked to place them on the lunch tray. Pictures were taken of the trays and researchers analyzed the post-consumption tray photographs alongside the pre-consumption tray photographs to determine the average percentage of dairy consumed for each student over the two days.

**Results:** A total of 419 students had complete data for analysis. The average consumption over two days, at lunch, was 1.15 servings or 9.2 ounces. Students bringing meals from home had 0-0.5 servings of dairy, and was mostly in cheese from pre-packaged lunches.

**Conclusions and Application:** Student consumption did not seem to be affected by meal offerings across the two days. Based on the Dietary Guidelines, children of this age need three cups of dairy per day and based on results from this study, students are averaging only one of these servings at lunch. Results can be used to send target marketing to student groups and promote dairy consumption of all kinds at schools. Furthermore, future research should evaluate the use of non-dairy, plant-based, milk beverages at schools.

***Dairy Consumption of Students in Elementary Schools Participating in the National School Lunch Program: Practices and Perceptions***

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**Introduction:** Milk is a nutrient-dense food that provides many essential vitamins and minerals, helps protect against chronic diseases, and also promotes growth in children. Dairy consumption has decreased among the population in the United States, with reasons for the decline unclear.

**Objective:** The purpose of this study was to evaluate milk/dairy preferences and in a sample of elementary school children participating in the National School Lunch Program.

**Methods:** A 15 item questionnaire was given to fourth and fifth grade students in two rural elementary schools.

**Results:** A total of 87 students responded to the survey and 82 responses were analyzed. The majority (n=67, 81.7%) were 10 or 11 years old and 51.2% (n=42) reported being Caucasian. Majority of students 58.5% (n=48) reported drinking milk 4-7 days per week. While 31 (37.8%) students reported drinking 1 or 2% milk, 36 (44%) preferred chocolate with 30 (36.6%) preferring white (unflavored), and 11 (13.4%) strawberry. Majority of the students reported that home (n=49, 59.8%) and school (n=45, 54.9%) were where they most often selected milk and yogurt as well as cheese were the most common sources of dairy other than milk. Reasons for not drinking milk included “I don’t have time”, “I don’t like [brand]”, “I have gotten sour milk before”.

**Conclusions and Applications:** In this sample, it seems that milk is consumed regularly both at school and at home and is readily available. This study was conducted at two rural schools, and more data should be collected from a variety of schools. In addition, this data is self-reported and food photography would be a more precise measure of consumption at school. Nevertheless, items offered at school, like low-fat milk and flavored fat-free milk, seem to be acceptable to this age group.

***Perception of School Nutrition Professionals (SNP) regarding barriers, challenges, solutions, and strategies for designing school-specific, HACCP-based food safety plans***

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**Objective:** To determine the barriers and challenges when developing a school-specific HACCP plan and to discover and design strategies and solutions to overcome them.

**Methods:** This study employed a mixed-method design utilizing an 8-hour long focus group, with demographic and open-ended questions to understand the role of SNP in developing school-specific HACCP-based food safety plan. Participants recorded their responses on a questionnaire (30 qualitative & 10 quantitative). A convenience sample of 10 SNP (5 School Nutrition Directors, 2 Compliance personnel, 2 Supervisors, and 1 person in the “Other” category) directly involved in different aspects of food safety were invited. They represented 5 USDA-FNS regions (3 southwest, 1 western, 2 mountain-plain, 3 mid-atlantic, 1 midwest); 9 different states; and 3 school district sizes (classified by student population: 5 small, 1 medium, 3 large, 1 Did not specify; ranging from 202–46,000 students). Data were analyzed using grounded theory, which

includes the open-coding method (Initial coding), followed by in-vivo coding and focused coding (Charmaz, 2006).

**Results:** Several themes of participants' perceptions included: 1) resources are limited; 2) staff is insufficiently skilled and motivated (n=5/10, 50%); 3) HACCP plans can be 'lengthy', 'too sophisticated', and 'lack specificity' (n=5/10, 50%); 4) regularly updating HACCP- based Standard Operating Procedures (SOPs) upon changing menus is time-consuming (n=5/10, 50%); 5) budget issues (n=6/10, 60%); 6) lack of templates and guiding documents (n=4/10, 40%); 7) and communication barriers (n=6/10, 60%) preventing the successful development of a plan. Forty percent (n=4/10) developed the HACCP-based food safety plan themselves. Although using the Process Approach is important to develop a HACCP food safety plan, only 70% (n=7/10) of the SNP are utilizing it. To overcome the challenges previously mentioned, participants sought specialized staff training, financial support, and specialized equipment and food safety supplies.

**Conclusion and Application:** A specialized workshop to overcome barriers and challenges is important for successful school nutrition programs. Our recommendation is to develop hands-on workshop that can empower different stakeholders in terms of knowledge, skills, time management, and an opportunity to raise and secure funds. The workshop can help them devote time to develop a school specific SOPs and communicate and secure assistance from an expert trainer and other School Nutrition Directors/Managers. Regular training of the staff to motivate them is important.

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***Measuring the Impact of Farm to School: A Simulation Study***  
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**Background:** Initiatives such as Farm to School programs were designed to increase consumption of local fruits and vegetables, boost local economies, and decrease rates of obesity in the United States. Currently, there is limited research regarding feasibility of procuring and implementing completely locally grown menus in child nutrition programs participating in the National School Lunch Program. Understanding such costs can aid in education and decision making of school districts interested in implementing a Farm to School program.

**Objectives:** The purpose of this study was to use current procurement practices in one school district for the 2017-2018 academic year and simulate that purchasing to estimate the impact of using a locally grown menu.

**Methodology:** A descriptive case study design with purposive sampling was used to obtain data regarding current procurement practices and menu items being served. The prime vendor as well as vendors for smaller purchases and milk provided item names, counts, and weights for all of the purchases in one academic year for the district. Data were entered into Excel and sorted by food type. Next, volume and weights were calculated using item counts, weight per item, and number of cases purchased for each school over the course of the year. Then, foods were separated by meal plan category and those weights/volumes were calculated. Finally, a

simulation study was conducted where items that could be locally procured were identified and substituted at 25%, 75%, and 100%. The volume/weight measures were then recalculated to estimate the impact that each local procurement level would have on producers.

**Results:** Majority of items purchased at each level were fruits, vegetables, and milk. Non-starchy vegetables were purchased in the largest volume at 398,560 pounds, followed by fruit (34,752 pounds of whole fruit and 41,155 gallons of fruit juice), dairy (36,566 gallons), protein (202,128 pounds), grains (167,501 pounds), starchy vegetables (114,804 pounds), and oil (1,299 gallons).

**Conclusion and Application:** The district evaluated is one of the largest in the state and has nearly 10,000 students. On average, 8,949 meals are served each day (2,947 at breakfast and 6,002 served at lunch) and 44,745 meals are served each week. The amount of food being purchased by a district of this size is unlikely to be produced by one farmer or even one cooperative. The volume/weight of combination foods (i.e. corn dogs, chicken nuggets) is difficult to estimate and the majority ingredient was chosen to represent that weight. Purchasing only local foods would require changes in menu items and greater flexibility in meal patterns depending on where the schools are located.

### ***A Collection of Resources to Reduce Pre-Consumer Food Waste***

**Michelle Alcorn, MS; Paola Paez, PhD; Carol Shanklin, PhD, RD. Kansas State University**

A multi-phase approach was used to develop a collection of resources to assist school nutrition professionals in implementing strategies to decrease pre-consumer food waste. The research team completed a comprehensive literature review to identify the content of an initial flow diagram and activity list. To obtain feedback on the flow diagram and activity list, 20 school nutrition professionals were invited to participate in a Delphi procedure. Seventeen responses were received from 13 participants during the two review rounds of the modified Delphi process. The flow diagram includes nine steps in the flow of food related to school foodservice: planning, purchasing/ordering, receiving, storing, issuing, producing, transporting, serving, and managing leftovers. The steps issuing, transporting, and managing leftovers were added to the model based on panelists' feedback. The flow diagram depicts active managerial controls to illustrate the importance of these on-going processes essential to reducing pre-consumer food waste throughout each step of the flow of food. The activity list summarized operational activities personnel could follow to reduce food waste while maintaining safe food practices, such as the use of ingredients in multiple recipes for the planning step or the use of cooling equipment on the serving step. An in-depth online search was completed to identify resources and information related to food waste applicable to school nutrition programs and served as the foundation for the development of the summary table. The summary table provides a selection of reports, articles, and tools that school nutrition professionals can utilize to address food waste while maintaining food safety. This collection of resources can be used to identify and implement strategies to reduce pre-consumer food waste in school nutrition programs and develop educational materials.