

## **Are Meals Served During School Field Trips Safe from Listeria and Salmonella? A Simulation Study to Evaluate the Safety of Lunches Stored in Coolers in Extreme School Bus Temperatures**

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### **Research Objectives**

Monitor growth of *Listeria monocytogenes* and *Salmonella* spp. in common school lunch foods packed in insulated coolers and held at simulated temperatures for a summer day on an enclosed school bus.

### **Methods**

Lunches meeting NSLP standards containing a turkey sandwich (~45g deli turkey, whole grain bread), sliced apples (50g), and baby carrots (50g) were inoculated with five-strain cocktails of *Salmonella* or *L. monocytogenes*. Two inoculated and eight non-inoculated lunches were packed in each layer (bottom, middle, and top; 30 total lunches) of two coolers (24in x 13in x 14in), one without ice and one with ice at the bottom. Packed coolers were exposed to temperatures (~24°C/75°F to 66°C/151°F over 5 hours) simulating a school bus during hot weather. Food temperatures were monitored continuously by thermocouples. Food item samples were plated onto selective media for bacterial enumeration. Data (n=3) were analyzed using the SAS MIXED procedure.

### **Results**

Ice usage, location within the cooler (control, top, middle, bottom), and ice usage-location interaction were not statistically significant ( $P>0.05$ ) for sandwiches, apples and carrots inoculated with *Listeria monocytogenes*. Ice usage and location within the cooler were not statistically significant ( $P>0.05$ ) for sandwiches and apples inoculated with *Salmonella*. Ice usage-location interaction was not significant ( $P>0.05$ ) for *Salmonella* on carrots, sandwiches and apples. *Salmonella* populations on carrots did vary ( $P\leq 0.05$ ) according to location in the cooler; however, control samples harbored the largest population.

### **Application of Results**

Packing school lunches for field trips exposes foods to increased risk due to elevated ambient temperatures. Though this study suggests time might be an adequate safety control for *Salmonella* and *L. monocytogenes*, this may not be the case for other pathogens and foods. Child nutrition professionals should be educated about the importance of maintaining the cold chain during field trips by packing lunches in insulated coolers with 2-3 layers of ice or icepacks.

# **Parents' Perceptions Regarding the National School Lunch Program**

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## **Research Objectives**

Since implementation of the Healthy, Hunger-Free Kids Act, there has been considerable negative press regarding school meals and nutrients provided. Parents may be unaware of the meal standards and regulations associated with school meals. The purpose of this study was to identify predominant factors that may lead to negative perceptions or lack of participation in school meals.

## **Methods**

As part of a larger Farm to School study, online anonymous surveys were sent to parents of children in grades 3-12 at public schools in a mid-size, southern city.

## **Results**

A total of 208 parents responded. The top reasons reported for children eating school lunch were: It is convenient (75%); I like my child to eat a hot lunch (60%); and My child's friends eat school lunch (47%). Reasons for not eating school meals included: Lunch from home is a healthy meal (71%); My child sometimes doesn't like what is being served at school (70%); and Bringing a lunch from home gives my child more time to eat (57%). A majority (85%) of parents reported that their child had not said anything to them about the changes in the law regarding school meals or the USDA Meal Pattern.

## **Application of Results**

While feedback about meal participation is certainly important for school nutrition directors to consider, a larger concern may be the lack of parental understanding regarding meal changes and current offerings. Gathering data about meals brought from home as well as educating parents about their children's nutrient requirements are important next steps that school nutrition professionals could consider as marketing tools to increase school meal participation. Transparency within school meal programs and inviting parents, legislators, and community activists to lunch may be ways to increase positive publicity for school meals.

# **Perceptions Regarding the Healthy, Hunger-Free Kids Act and National School Lunch Program**

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## **Research Objectives**

Foodservice employees' nutrition knowledge, food preparation practices, and communication with students play major roles in the dietary habits of those participating in the National School Lunch Program (NSLP). The purpose of this research was to assess the perception of School Foodservice Employees (SFE) regarding NSLP eligibility, standards, and success of Healthy Hunger Free Kids Act (HHFKA) implementation.

## **Methods**

An anonymous, online survey was distributed by email through the state child nutrition unit to directors of school nutrition programs in a southern state.

## **Results**

A total of 201 participants included district foodservice directors (41.8%) and school managers (26.4%) in rural schools (56.7%). More than 70% reported discussing making healthier choices with students in the cafeteria; 81% reported the entire school environment affects students' nutritional health, and 82% indicated plate waste was a significant issue of concern. When asked about changes in program participation, 68% reported lunch participation decreased after HHFKA, and 53% said breakfast participation stayed the same. In order to meet sodium restrictions while increasing fruit and vegetable servings, participants reported using frozen vegetables instead of canned (70%), salt-free seasonings (61%), and "scratch" cooking (54%). Many (90%) agreed or strongly agreed that employees were adequately trained, and 74% reported their job gives them the opportunity to do what they do best every day. The majority of participants correctly identified reimbursable meals when given pictures.

## **Application of Results**

Each school food authority has the responsibility to provide nutritious, well balanced, acceptable meals to students. Based on these findings, managers and directors are aware of the role of the environment on overall health, have made changes to meet new standards, and can readily recognize reimbursable meals. Future research should evaluate knowledge of technicians as well as actual meal participation data before and after menu changes were enacted.

## **Delivery and Holding Methods of Milk Served Outside of the Cafeteria: Current School Breakfast Program Practices**

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### **Research Objectives**

To identify current practices for transporting, holding, and serving fluid milk in School Breakfast Programs in locations other than the cafeteria. To establish protocols for simulating the most effective methods for maintaining safe milk temperatures during transportation, holding, and service.

### **Methods**

A two phase approach was used to select a sample of school nutrition directors to survey. Known contacts were telephoned requesting their participation in a survey; then a random sample was chosen from each United States Department of Agriculture, Food and Nutrition Service (USDA, FNS) region based on district size. The survey included 31 questions related to 1) nutrition program and district characteristics, 2) breakfast service styles, 3) milk served outside the cafeteria, 4) unconsumed milk, and 5) future research. To increase survey response rate, directors were telephoned one to two weeks after the initial contact. An email was sent to non-respondents after one month. Descriptive statistics were calculated.

### **Results**

A total of 31 useable surveys were collected. Data were obtained from each region of the USDA FNS and school districts of varying sizes. Several schools (41%) delivered breakfast to the classroom. The most common transportation containers were soft-sided cooler/insulated bag (57%), non-insulated box (43%), and hard-sided cooler (32%). Most schools (61%) used ice with transportation containers. The majority of schools (83%) reported that milk was out of refrigeration for less than one hour, and most schools (62%) restocked unconsumed milk for later use. Milk must be kept below 40° F to ensure quality and safety.

### **Application of Results**

This study establishes a baseline about current milk service practices of milk served in locations other than the cafeteria at breakfast. Results from this study will be used to develop simulations to determine the most effective transportation and holding methods to maintain safe milk temperatures and ensure the quality of the product.