

Observed Food Safety Practices in the Summer Food Service Program

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ABSTRACT

Purpose/Objectives

The purpose of this exploratory, observational study was three-fold: 1) Determine current food safety practices at Summer Food Service Program (SFSP) sites; 2) Identify types of food served at the sites and collect associated temperatures; and 3) Establish recommendations for food safety training in the SFSP.

Methods

Twenty-eight SFSP sites in seven states were observed during preparation, service, and clean-up to assess food safety practices. Before the study, researchers participated in a day and half training session which included a pilot test of the observation tools at school kitchens. Individuals completed the forms and in pairs they compared findings; final adjustments to the observation forms were made. Descriptive statistics were calculated using Excel.

Results

Twenty-five sites had at least one employee or volunteer who reported having had food safety training. Proper handwashing facilities were available and accessible at most preparation sites (n=21) and fewer service sites (n=15). Proper handwashing (n=14), glove changing (n=13), and thermometer use (n=10) were commonly out of compliance among observed sites.

Application to Child Nutrition Professionals

As the SFSP expands, assuring food safety is important to the success of the program. Overall improvement is needed in personal hygiene, time/temperature control, and cleaning/sanitizing practices. New program sponsors may benefit from careful planning with food safety in mind and should provide relevant food safety training to employees and volunteers. State agencies may assist sponsors in meeting food safety training needs.

Keywords: food safety; summer feeding; SFSP; child nutrition programs

INTRODUCTION

The Summer Food Service Program (SFSP) is administered by the U. S. Department of Agriculture's (USDA) Food and Nutrition Service (FNS). While many children in low-income areas have ready access to meals and snacks during the academic year through the National School Lunch Program, the SFSP is designed to provide continued access when school is out of session (USDA-FNS, 2015a). The SFSP was first pilot tested in 1968, and was later authorized as a permanent program in 1975 (Gordon & Briefel, 2003).

The SFSP requires collaboration between USDA, State Agencies, sponsors, and sites to function (Food Research & Action Center [FRAC], 2015). State Agencies administer the SFSP through

contracts with authorized sponsors within a state which commonly include School Food Authorities, government agencies, residential camps, national youth programs, and other nonprofit organizations (Gordon & Briefel, 2003). Sponsors recruit and train personnel, monitor sites, and report meal counts to the State Agency. Approved meal sites are safe and supervised locations within the community; often these are schools, parks, churches, community centers, and migrant centers (Gordon & Briefel, 2003). Each site prepares and/or serves food and supervises children during meal times.

Recently, there has been an effort by USDA to expand the reach of the SFSP as less than one in six qualified children participates in the program (FRAC, 2016; USDA-FNS, 2015a). In July 2015, the peak month for the SFSP, meals were provided to 2.6 million children across the country (USDA Economic Research Service, 2016). From 2014 to 2015, there was a 4.6% increase in sponsors and 5.6% increase in sites across the nation (FRAC, 2016). As the program grows, it is important to assure food safety is a consideration in planning and practice, primarily to keep children safe and healthy, and secondarily to maintain and build the reputation of the program itself (USDA, 2016b).

Special consideration should be paid to the potential food safety risks associated with operating SFSPs and the sometimes unique scenarios in which they can function. Although some sites prepare and serve food in a single location, others require transportation to one or more satellite locations where food is held during service. Some of these sites do not have the convenience of a fully equipped kitchen and as such, there can be barriers to proper handwashing and holding hot or cold foods at correct temperatures. Additionally, summer's higher ambient temperatures can pose challenges for food temperature control, especially as food is transported to satellite locations and/or served outdoors.

Further, like other foodservice operations, employee and volunteer food safety training can be difficult to complete due to staff turnover and challenges with communication (United States Department of Health and Human Services [HHS], 2016). An added consideration with the SFSP is the abbreviated nature of program. With the program only running in summer months with definite start and end dates, it may be difficult for employees and volunteers to be trained and functioning at the expected level within such a limited time frame. Finally, many SFSP sites rely on volunteer support to prepare, deliver, and serve meals to children. Volunteers for SFSP may have limited knowledge and skill sets related to safe food handling and therefore may not know proper guidelines for cooking temperatures, holding temperatures, Time/Temperature Control for Safety (TCS) foods, and/or proper cleaning of hands and surfaces (HHS, 2016). TCS foods require controls for time and temperature to limit the growth of pathogens or formation of toxins in foods such as meat and poultry or cut melons and tomatoes (FDA, 2013).

Food safety is essential to the success of SFSP, and the unique nature of the program calls for its specific attention and investigation. The purpose of this exploratory, observational study was three-fold: 1) Determine current food safety practices at SFSP sites; 2) Identify types of food served at the sites and associated temperatures; and 3) Establish recommendations for food safety training in the SFSP.

METHODOLOGY

Research Approval

The research protocol for this study was approved by the Institutional Review Boards at Kansas State University and the University of Mississippi. Each of the researchers involved completed human subjects training prior to data collection.

Sample

The sample for this study consisted of 28 SFSP sites, four sites from one state in each of the seven USDA FNS regions. Researchers used convenience sampling to observe a variety of sponsor types and service sites within a reasonable geographic area. An effort was made to include sites not administered by or associated with School Food Authorities, since schools should follow more standard food safety practices as specified in their food safety program based on Hazard Analysis and Critical Control Points (HACCP) (Healthy, Hunger-Free Kids Act, 2010). Site locations and operating dates were identified through USDA FNS's (2015b) Summer Meal Site Finder website and/or coordinating with State Agencies.

Observation Instrument

A SFSP food safety observation instrument previously developed by the Center of Excellence for Food Safety Research in Child Nutrition Programs, USDA FNS, and Institute of Child Nutrition (ICN) was adapted and modified for this study (ICN, 2015). Overall, the instrument was designed to identify relevant characteristics of the SFSP site and assess observed food safety practices. An iterative review process of the observation instrument was completed by the research team to assure the tool was clear and comprehensive. Once finalized, the instrument comprised of 11 sections involving a series of open-ended and multiple-choice components for researchers to complete during the observation. The instrument included sections for assessing employee hygiene, time/temperature control, cold storage, cleaning and sanitizing work surfaces, preparation facilities, transportation of food, service, and service facilities. In addition to the observation instrument, a research protocol and an all-inclusive materials checklist were developed to provide guidelines for data collection and assure researchers had the supplies needed for each observation.

Data Collection

Training and Pilot Test. Seven researchers with prior experience in foodservice and observational research collected the data. The research team completed a one-and-a-half-day training session which included a thorough review of the research protocol and data collection procedures. A pilot test was conducted; researchers went in pairs to observe school kitchens participating in the SFSP similar to the methodology Roberts et. al (2014) employed in their food safety observation study. Within the pairs, each researcher recorded the findings on the observation instrument, and at the end, pairs compared their notes. Following this, researchers incorporated modifications to the observation instrument to improve clarity and efficiency in the research process.

Site Visits. Using a common script, researchers recruited observational sites in their assigned state via email and/or phone correspondence. Each researcher completed four observations within a seven-day period during July and August 2015. The observation included meal production, service, and clean-up. Each staff member (employee or volunteer) present at the site during the observation period completed a consent form.

Temperatures of meal items were recorded using a thermocouple USB data logger (Lascar EL-USB-TC-LCD). The device's probe was inserted into the center of selected food items after preparation or assembly and removed after service; food temperatures were recorded at five minute intervals. When available, both hot and cold TCS foods (e.g., milk, meat, poultry, sliced melon) were used for this study component.

Data Analysis

Data were entered into Microsoft Excel, and descriptive statistics; including frequencies, percentages, and means, were calculated. Comment summaries from observations were compiled in a Microsoft Word document. Temperature data from data loggers was imported into Microsoft Excel, and time in the Temperature Danger Zone (TDZ), the temperature range of 41°-135° F in which pathogens rapidly grow and can potentially lead to foodborne illness, was calculated for each monitored food item.

RESULTS AND DISCUSSION

Site Characteristics

Data on preparation and/or service were collected at 28 sites; site characteristics are summarized in Table 1. The observed sites were sponsored by a variety of non-profit organizations and several School Foodservice Authorities. The most common sites observed were community centers (n=12), parks (n=6), housing complexes (n=5), and churches (n=5). Meals were primarily prepared in central kitchens (n=12). The average number of meals prepared at each site ranged widely from 20 to 5,000 meals per day due to the variety of preparation sites. Some preparation sites prepared meals for a variety of venues including SFSP sites and senior centers. Food was served at most sites by paid employees (n=25) and/or at some sites by volunteers (n=8). The food was predominantly plated from a serving line (n=16); however, box lunches (n=9) and sponsor-pre-packaged items (n=6) were also served.

The total number of employees observed at a site ranged from 1 to 14, and the total number of volunteers observed at a site ranged from 0 to 7. Most sites (n=25) had at least one staff member (hereafter referring to employees and volunteers) who reported having some food safety training. However, it is noteworthy that 3 observed sites did not have at least one staff member with food safety training. For those who reported trainings, these included both on- and off-site programs such as summer feeding training, health department training, food handler cards, or ServSafe® certification.

Personal Hygiene

Researchers observed a series of food safety behaviors and assessed access to needed facilities and equipment at the 28 sites (Table 2). Handwashing facilities were more available and/or accessible at food preparation sites (n=21) than at service sites (n=15). At a majority of sites, staff members were compliant with using gloves and utensils as needed (n=24). However, compliance with changing gloves/utensils as needed, properly changing gloves/utensils, using proper handwashing procedures, and washing hands as needed was less consistent across all observations. This opportunity to improve hand hygiene is consistent with findings from other research focused on food handling of school foodservice employees (FDA, 2009; Kwon, Roberts, Sauer, Cole, & Shanklin, 2014; Roberts et. al, 2014; Strohbehn, Sneed, Paez, & Meyer, 2008), restaurant employees (Green et. al, 2005; Kwon et. al, 2014), and consumers (Academy of Nutrition and Dietetics, 2011; Sneed et. al, 2015). Additionally, most observed sites (n=16) had staff members out-of-compliance with wearing hair restraints.

Table 1. Characteristics of Observed SFSP Sites (N=28)

Characteristic	Frequency
SFSP Site	
Community center	12
Park	6
Housing complex	5
Church	5
School	2
Other ^a	5
Foodservice Type^b	
Central kitchen	12
Satellite	9
Self-prep on-site	6
Commercially vended	4
Other ^c	2
Food Served by:	
Employees	25
Volunteers	8
Children (18 and under)	2
Other ^d	3
Food Served as:^e	
Plated from serving line	16
Box lunches	9
Sponsor pre-packaged items	6
Commercially packaged	1

^aCamp, library, recreation center, and town hall

^b28 sites were observed, but some of those sites were documented as more than one foodservice type so total exceeds number of sites observed.

^cDonated food and residential kitchen.

^dTeachers, food bank staff, combination of staff, volunteers, and children

^eSome sites used multiple serving methods.

Time/Temperature Control

Time and temperature control practices including properly using a thermometer, correctly taking and recording internal end-point preparation temperatures of hot foods, and adequately cooling hot foods were observed (Table 2). Staff at 16 of 26 sites were compliant with properly checking food temperatures during the observation periods. When observed, the internal end-point hot preparation temperatures were checked properly at most of the sites (13 of 19). This is a positive finding considering Green et al. (2005) found that only 47.3% of foodservice workers self-reported using a thermometer to check the doneness of food, and HHS (2016) identified that consumers determining appropriate final cooking temperatures is a national challenge for consumers. Staff members were less compliant with calibrating thermometers, and washing, rinsing, sanitizing, and air drying thermometers before and after use. Only 4 observed sites had staff cooling hot foods, and all 4 incidents were compliant with safe cooling methods.

Table 2. Food Safety Practices and Facility Characteristics at Observed SFSP Sites

Observed Practice	Number		Total Observations
	In-Compliance	Out-of-Compliance	
Personal Hygiene			
Staff members use gloves/utensils as needed	24	3	27
Proper handwashing facilities available and accessible at preparation facilities	21	5	26
Proper handwashing facilities available and accessible at service facilities	15	10	25
Staff members change gloves/utensils as needed	12	13	25
Staff members wash hands as needed	11	15	26
Staff members use proper handwashing procedure	11	14	25
Staff members wear hair restraints	9	18	27
Staff members properly change gloves/utensils	9	16	25
Time/Temperature Control			
Thermometers used to check temperatures	16	10	26
Internal cooking temperatures are checked	13	6	19
Internal cooking temperatures are recorded ^b	9	4	13
Thermometers are washed, rinsed, sanitized and air dried before and after use	6	9	15
Adequate cooling method used	4	0	4
Thermometers are calibrated	3	8	11
Cleaning and Sanitizing			
Food contact surfaces and utensils are clean to sight	17	6	23
Sanitizing solutions are used	16	9	25
Cleaning solutions are used	11	12	23
Sanitizing solutions are at correct concentrations	10	10	20
Cleaning/Sanitizing solutions are changed as needed	6	8	14
Sanitizing concentrations are documented	1	19	20

^aThe number did not always equal 28 because the practice was not observed/not applicable at some sites.

^bTotal observations represent the number of sites where internal end-point hot preparation temperatures were checked and in-compliance.

For sites that transported food to service locations (n=22), time/temperature control practices were evaluated. All observed sites used food transportation containers in good condition. Three of 22 sites used refrigerated trucks to deliver food. The fact that most of these sites used a vehicle without refrigeration to transport food is notable. Kim, Yun, Lee, Hwang, and Rhee (2013) found that cold foods transported in car trunks exposed to sunlight reached the TDZ within 10 minutes. Sponsors and site staff should be aware of travel time and not overlook the rapidity with which food temperatures can change, especially during summer months. At 7 sites, staff were observed checking food temperatures upon arrival. Researchers also took temperatures of delivered food when feasible; they found that of 14 sites that received hot foods,

11 received them at temperatures of 135°F or above. Of the 15 sites that received cold foods, only 5 had food temperatures at or below 41°F. This may be related to the higher ambient temperatures in the summer months and particularly during the typical hours of meal service, and/or it may be due to cold foods being prepared near service time and not having adequate time in cold holding to fall to 41°F prior to transport and service. Time spent in the TDZ allows pathogen growth which could ultimately result in a foodborne illness outbreak.

During the site observations, USB data loggers were inserted into hot or cold foods (TCS foods when available) from the time they were prepared until the time of service. These devices recorded the temperatures of each food every five minutes. In total, temperature trends of 52 food items were tracked – 23 hot food items (Table 3) and 29 cold food items (Table 4). Of the 23 hot food items, 6 maintained a temperature at or above 135°F throughout the measurement period, the range of total time in the TDZ was 0 to 190 minutes, and the average time for hot food items in the TDZ was 45 minutes. The range of the lowest temperature reading for hot food items was 44.5-166°F and the range of the highest temperature readings for hot food items was 109-201.5°F.

For the 29 cold food items (Table 4) tracked, 2 of the items (both milk) maintained a temperature at or below 41°F throughout the measurement period. For cold items, the time spent in the TDZ ranged from 0 to 260 minutes with the average time in the TDZ being 90 minutes. The range of lowest temperature readings for cold items was 33-71.5°F, and the range of the highest temperature readings for cold items was 34.5-94.5°F. Eight cold foods and 2 hot foods were held in the TDZ for longer than two hours. One cold food remained in the TDZ for longer than four hours, and its highest temperature reading was 70°F, which is acceptable up to six hours if disposed of at that point (FDA, 2013). Overall, fewer hot food items were held in the TDZ, and they spent less time overall in the TDZ than cold foods. Positively, the temperature trends complied with the standards identified by the FDA (2013) of using time as a public health control. That said, it was not always clear among the sites that time as a public health control was the food safety practice in place.

These temperature readings demonstrate the difficulty associated with maintaining food temperatures under the various conditions SFSP meals are served. Awareness of these challenges can inform menu development to mitigate time/temperature food safety concerns. Sponsors should be vigilant in training staff in the use of time as a public health control, particularly the importance of having initial temperatures at 41°F or below for cold foods or 135°F or higher for hot foods, documenting the time frames for disposal, and complying with disposal guidelines (FDA, 2013). Additionally, to keep SFSP participants safe from potential foodborne illness, sponsors should highlight and explain to all site staff the SFSP policy requiring meals to be consumed on-site with the possible exception of taking a fruit, vegetable, or grain off-site (USDA-FNS, 2016a). The foods tracked in this study met the guidelines for safe food, but an additional consideration is the acceptability of these foods for participants. Presumably, participants are more likely to consume foods (and get the nutrition they need) if foods are at appropriate temperatures; future research should investigate this further.

Cleaning and Sanitizing

Researchers found that cleaning and sanitizing solutions were underutilized (Table 2). At sites where cleaning and sanitizing was observed, 16 sites used sanitizing solutions, and 11 sites used

cleaning solutions. Many of the sites (n=17) were compliant with having food contact surfaces and utensils clean to sight and sanitized before use. This is similar to Roberts et al.'s (2014) finding that in 86 of 110 observations of school foodservice workers, food contact surfaces and utensils were clean to sight and touch and sanitized before use.

Table 3. Recorded Temperatures for Hot Food Items and Time in the Temperature Danger Zone (TDZ)

Food Item	Lowest Temperature °F^b	Highest Temperature °F^b	Time in minutes in TDZ
Breaded chicken patty	135.0	187.5	0
Cheeseburger	90.5	109.0	190
Chicken	100.0	170.5	5
Chicken fried steak	112.5	199.0	20
Chicken strips	44.5	140.5	80
Chili mac	150.0	169.0	0
Corn A ^a	80.5	116.0	90
Corn B ^a	145.5	175.5	0
Corn dog	75.0	148.5	35
Green Beans	100.5	146.0	5
Hot dogs	118.0	134.0	80
Meatballs A ^a	166.0	181.5	85
Meatballs B ^a	83.0	142.0	80
Pizza A ^a	144.5	155.5	0
Pizza B ^a	145.5	168.0	0
Pizza C ^a	99.5	173.0	15
Pork roast	80.5	172.5	165
Sausage	159.0	179.5	0
Spiced apples	117.5	195.0	15
Stew	100.0	191.0	30
Sweet peas	101.5	170.0	85
Sweet potato casserole	118.5	132.5	45
Taco meat	109.0	201.5	5

^aSeveral food items were served at multiple locations. To differentiate them, a letter was designated to those food products.

^bThese temperatures were individually the highest and lowest temperature recorded for a single food.

Only 6 observed sites were in compliance with changing the cleaning/sanitizing solutions as needed. This aligns with Roberts et al.'s (2014) finding that in 53% of their observations of school foodservice employees, sanitizer solutions were not changed as they should be. The sanitizer concentration was correct at half (10 of 20) of the SFSP sites at which it was tested. Only 1 of the observed sites was observed documenting the sanitizer concentration. The less traditional and temporary nature of some SFSP sites may contribute to lower compliance with these food safety practices. Clearly identifying cleaning and sanitizing processes for kitchens and particularly service locations for SFSP would aid staff and contribute to improved food handling practices.

Table 4. Recorded Temperatures for Cold Food Items and Time in the Temperature Danger Zone (TDZ)

Food Item	Lowest Temperature °F^b	Highest Temperature °F^b	Time in TDZ Minutes
Applesauce	45.0	61.5	50
Baby carrots	47.0	63.5	160
Cantaloupe	43.5	47.0	85
Carrots	57.5	76.0	85
Cheese	36.0	57.0	50
Chicken salad	49.0	55.0	85
Cucumber slices	43.5	67.5	115
Fajita chicken	37.5	66.0	40
Fruit A ^a	48.5	56.0	70
Fruit B ^a	71.5	94.5	190
Ham and cheese sandwich A ^a	58.0	59.0	75
Ham and cheese sandwich B ^a	42.0	52.0	160
Lettuce	39.0	55.0	60
Milk A ^a	33.5	35.5	0
Milk B ^a	33.0	39.5	0
Milk C ^a	39.0	45.5	15
Milk D ^a	54.0	56.5	70
Milk E ^a	64.0	66.0	40
Milk F ^a	34.0	34.5	30
Peaches, canned A ^a	52.0	43.0	160
Peaches, canned B ^a	76.0	34.5	85
Pears, canned	41.0	68.0	145
Potato salad	47.5	70.0	260
Sack lunch ^c	48.0	57.0	235
Shredded cheese	39.5	50.5	65
Tuna salad	46.0	64.0	90
Turkey cranberry	35.0	66.0	100
Turkey sandwich A ^a	62.5	68.0	35
Turkey sandwich B ^a	50.0	67.5	130

^aSeveral food items were served at multiple locations. To differentiate them, a letter was designated to those food products.

^bThese temperatures were individually the highest and lowest temperature recorded for a single food.

^cThe sack lunch included a small container of non-commercially prepared tuna salad. The container did not allow for the use of the data logger probe in the tuna salad.

CONCLUSIONS AND APPLICATION

Observations of food safety practices revealed a need for overall improvement of food safety, particularly in personal hygiene, time/temperature control, and cleaning and sanitizing practices. As participation in the SFSP continues to increase, ensuring the safety of food served is critical to protecting the health of the participating children.

Sponsors need to assure food safety training is available and effective for employees and volunteers. This can be difficult with the short-term nature of the program and the transience of volunteers. Sponsors are recommended to utilize resources available through the USDA and ICN to ease the burden of developing their own training tools. Training priorities should include personal hygiene, proper thermometer use, and proper use of sanitizer. It is important to educate staff on the specifics of time/temperature control, especially clarifying monitoring and corrective action steps that staff need to take to prevent pathogen growth and/or foodborne illness. State agencies rallying to increase SFSP participation may consider developing food safety training materials that are suited for the various levels of involvement in the program (e.g., short-term volunteer vs. full-time staff member or supervisor).

Characteristics of sites observed in this study varied widely despite their common purpose. Some of the observed sites prepared and served food on-site, while others utilized a central kitchen and transported food to one or more satellite location for service. Each service varied in what equipment and resources were available for transporting, holding, and serving food. As the SFSP expands, new sponsors will determine the characteristics of their foodservice program, particularly organization, size, menu, preparation and service type, and staffing. It is important that as they do this, they consider the unique food safety challenges associated with each characteristic and identify ways to manage them properly. For example, if staff are serving food at a housing complex or park without reasonable access to a handwashing station, the sponsor can provide the materials and training for staff to assemble and use a temporary handwashing station. Specific cleaning and sanitizing supplies and guidelines can be provided for the more temporary and unique service site locations. State Agencies can furnish sponsors with best practices based on state and federal food handling laws.

Findings from this study do provide a picture of food handling practices at the observed SFSP sites; however, they may not be generalizable to the entire SFSP program. Future research opportunities include developing and measuring the effectiveness of food safety training for short-term volunteers and assessing training methods and materials used when training SFSP employees and volunteers respectively. Another research opportunity is to identify perspectives of volunteers and employees on the importance of following food safety practices to enhance food safety in SFSP.

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REFERENCES

Academy of Nutrition and Dietetics. (2011) Consumer knowledge of home food safety practices survey. Retrieved from <http://www.eatright.org/resource/homefoodsafety/about-us/surveys/2011-consumer-knowledge-of-home-food-safety-practices-survey>

Food Research & Action Center. (2016). *Hunger doesn't take a vacation: Summer Nutrition status report*. Retrieved from http://frac.org/pdf/2016_summer_nutrition_report.pdf

Food Research & Action Center. (2015). *Hunger doesn't take a vacation: Summer Nutrition status report*. Retrieved from http://frac.org/pdf/2015_summer_nutrition_report.pdf

Gordon, A., & Briefel, R. (2003). *Feeding low-income children when school is out - The summer foodservice program: Executive summary*. E-FAN-03-001. USDA, Economic Research Service. Retrieved from https://www.ers.usda.gov/webdocs/publications/fanrr30/48129_fanrr30.pdf

Green, L., Selman, C., Banerjee, A., Marcus, R., Medus, C., Angulo, F. J., ... & EHS-Net Working Group. (2005). Food service workers' self-reported food preparation practices: An EHS-Net study. *International Journal of Hygiene & Environmental Health*, 208(1), 27-35. <http://dx.doi.org/10.1016/j.ijheh.2005.01.005>

Healthy, Hunger- Free Kids Act of 2010, S. 3307, 111th Congress, Pub. L. 111-296 (2010).

Institute of Child Nutrition. (2015). *Final report: Food safety in Summer Food Service Programs*. Oxford, MI.

Kim, S.A., Yun, S.J., Lee, S.H., Hwang, I.G., & Rhee, M.S. (2013). Temperature increase of foods in car trunk and the potential hazard for microbial growth. *Food Control*, 29, 66-70. <http://dx.doi.org/10.1016/j.foodcont.2012.05.064>

Kwon, J., Roberts, K. R., Sauer, K., Cole, K. B., & Shanklin, C. W. (2014). Food safety risks in restaurants and school foodservice establishments: Health inspection reports. *Food Protection Trends*, 34(1), 25-35.

Roberts, K. R., Sauer, K., Sneed, J., Kwon, J., Olds, D., Cole, K., & Shanklin, C. (2014). Analysis of school food safety programs based on HACCP principles. *Journal of Child Nutrition & Management*, 38(1). Retrieved from <http://schoolnutrition.org/JCNM/>

Sneed, J., Phebus, R., Duncan-Goldsmith, D., Milke, D., Sauer, K., Roberts, K. R., & Johnson, D. (2015). Consumer food handling practices lead to cross-contamination. *Food Protection Trends*, 35, 36-48.

Strohbehn, C., Sneed, J., Paez, P., & Meyer, J. (2008). Hand washing frequencies and procedures used in retail food services. *Journal of Food Protection*, 71(8), 1641-1650.

U.S. Department of Agriculture, Economic Research Service. (2016). *Summer Food Service Program*. Retrieved from <http://www.ers.usda.gov/topics/food-nutrition-assistance/child-nutrition-programs/summer-food-service-program.aspx>

U.S. Department of Agriculture, Food and Nutrition Service. (2015a). *The Summer Food Service Program: 2015 Administrative guidance for sponsors*. Retrieved from <http://www.fns.usda.gov/sites/default/files/AdminGuideSponsors.pdf>

U.S. Department of Agriculture, Food and Nutrition Service. (2016a). *Site supervisor's guide*. Retrieved from http://www.fns.usda.gov/sites/default/files/sfsp/Site_Supervs_Guide.pdf

U.S. Department of Agriculture, Food and Nutrition Service. (2016b). *Summer meals toolkit*. Retrieved from <https://www.fns.usda.gov/sfsp/summer-meals-toolkit>

U.S. Department of Agriculture, Food and Nutrition Service. (2015b). *Find summer meals in your community*. Retrieved from <http://www.fns.usda.gov/summerfoodrocks>

U.S. Food and Drug Administration. (2009). FDA report on the occurrence of foodborne illness risk factors in selected institutional foodservice, restaurant, and retail food store facility types. Retrieved from <http://www.fda.gov/downloads/Food/FoodSafety/RetailFoodProtection/FoodborneIllnessandRiskFactorReduction/RetailFoodRiskFactorStudies/UCM224682.pdf>

U.S. Food and Drug Administration. (2013). *Food Code 2013*. Retrieved from <http://www.fda.gov/downloads/Food/GuidanceRegulation/RetailFoodProtection/FoodCode/UCM374510.pdf>

U. S. Department of Health and Human Services, Office of Disease Prevention and Health Promotion. (2016). *Food Safety*. Retrieved from <https://www.healthypeople.gov/2020/topics-objectives/topic/food-safety>

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