Food Defense Practices in U.S. Schools

THE CENTER FOR FOOD SAFETY IN CHILD NUTRITION PROGRAMS

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Food Defense Practices in U.S. Schools

Summary Report

The Center for Food Safety in Child Nutrition Programs

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Executive Summary

Food defense plans in Child Nutrition Programs are not required by the United States Department of Agriculture, but are recommended to support a comprehensive food protection program. Food defense resources specific to schools have been developed by various government agencies and have been widely available to school nutrition program operators. Yet, anecdotal evidence suggests that food defense program implementation in schools is limited and understanding of such programs is unclear among professionals in the field.

The research related to food defense within the school environment is not substantial or consistent but has generally sought to determine areas of potential risk, identify practices implemented, and assess preparedness against intentional contamination. The findings of the available research are similar, with most practitioners having little concern for food terrorism or tampering in regard to current production systems.

The goal of this project was to comprehensively investigate existing practices to prevent deliberate or intentional acts of contamination or tampering in school nutrition programs. A structured telephone interview, guided by a questionnaire, was used to gather information concerning food defense practices from a national sample of school nutrition directors.

Results suggest that many school nutrition programs have room to improve food defense programs, practices, and the core understanding about food defense in their districts. However, many of the school nutrition programs have indirectly implemented components of a food defense plan as part of their overall HACCP-based food safety program. While the opportunity for improvement is evident in several areas, fundamental practices to prevent an intentional food defense incident were strong. Training was lacking across the sample and many respondents viewed food safety and food defense as one-in-the-same topic.

Acknowledgements

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Background

Food defense describes the protection of the nation's food supply from deliberate or intentional acts of contamination or tampering (United States Department of Agriculture Food Safety and Inspection Service, 2017). The actual number of said incidents is considered low, although the few cases of deliberate food contamination are well-documented (Anderson, DeMent, Banez, & Hunt, 2011; Brainard & Hunter, 2016; Buchholz et al., 2002; Centers for Disease Control and Prevention, 1989, 2003; Kolavic et al., 1997; Török, 1997). Even though the number of incidents is low, concerns about intentional contamination increased after the events of September 11, 2001.

Although food defense is an important part of a comprehensive food protection program for school nutrition operations, a formal food defense plan is not required in the school nutrition environment. More specifically, current food safety plans focus on accidental biological, chemical, and physical hazards. However, the United States Department of Agriculture (USDA) Food and Nutrition Service (FNS) recommends that Child Nutrition Programs develop a food defense plan (USDA FNS, 2007; USDA FNS, 2012). A comprehensive food defense plan in schools is multifaceted, encompassing many internal and external stakeholders. Stakeholders within the school district include the school nutrition team, maintenance and security staff, and both administrative and instructional staff. External stakeholders include local and state police, fire fighters, vendors, and state agencies related to safety, security, and child nutrition.

Resources specific to food defense training in schools have been developed by various government agencies and have been widely available to school nutrition program operators. The United States Department of Education Emergency Response and Crisis Management Technical Assistance Center has published *Food Safety and Food Defense for Schools*

(https://rems.ed.gov/docs/LatestFoodSafetyJune23rd.pdf). The USDA FNS published *Creating Your School Food Defense Plan (*https://fns-prod.azureedge.net/sites/default/files/ofs/Food_Safety_Creating_Food_Defense_ Plan.pdf) and *A Biosecurity Checklist for School Foodservice Programs: Developing a Biosecurity Management Plan (https://www.hsdl.org/?view&did=463416).* The Institute of Child Nutrition offers a tabletop food defense exercise for schools (https://theicn.org/?s=food+defense).

Summary of Previous Research

The majority of the research related to food defense programs within the school environment sought to determine areas of potential risk, identify practices implemented, and assess preparedness against intentional contamination. While different settings have been examined, findings were similar. Common research methods included surveys (mail and online), interviews, focus groups, observations, and analysis of documents.

When food defense plans were assessed, most studies found low concern for food terrorism or tampering and foodservice operators expressed little risk with current production systems (Klitzke et al., 2016; Klitzke, Strohbehn, & Arendt, 2014; Olds & Shanklin, 2014; Xirasagar et al., 2010b). The greatest perceived risk for intentional food contamination was with the supply chain prior to arrival at the foodservice operation (Klitzke et al., 2014; Klitzke et al., 2016). Areas for a potential attack identified for foodservice operations were unidentified staff and/or delivery personnel and access to cafeteria, central kitchens, service lines, storage areas, and delivery areas (Klitzke et al., 2016; Olds & Shanklin, 2014).

When practices were assessed, the least implemented practices were locked storage and delivery areas, secured chemicals, reviewing employees' criminal backgrounds, surveillance systems in place, communication with vendors/suppliers, delivery schedules posted with

information related to delivery personnel, and secured access (Olds & Shanklin, 2014; Story, Sneed, Oakley, & Stretch, 2007; Xirasagar et al., 2010b). In contrast, the most implemented practices were having an emergency response team, purchasing of food and supplies from a reputable supplier with permits and licenses, inspection of food packages, restricted access to production and storage areas, chemical use, and food storage (Story et al., 2007; Strohbehn & Klitzke, 2015; Yoon & Shanklin, 2007a, 2007b, 2007c).

Strohbehn and Klitzke (2015) noted that only 14% (78 of 543) of school nutrition programs reported having a food defense plan. Barriers to implementing a food defense plan included: lack of awareness and concern related to food terrorism, lack of motivation, cost, and the perception that food defense is solely the foodservice director's responsibility (Klitze et al., 2014; Klitze et al., 2016; Olds & Shanklin, 2014). Operations were more likely to have a food defense plan or perform food defense practices if operators perceived food defense practices as important (Yoon & Shanklin, 2007a), a designated employee was assigned to implement or monitor food defense practices (Yoon & Shanklin, 2007b), and/or employees had received food defense training (Strohbehn & Klizke, 2015).

Objectives

The goal of this project was to investigate existing practices to prevent deliberate or intentional acts of contamination or tampering in school nutrition programs.

Specific Objectives included:

1. Identify current practices to prevent deliberate or intentional acts of contamination or tampering in school nutrition programs.

2. Assess deficiencies in practices to prevent deliberate or intentional acts of food contamination or tampering in school nutrition programs.
3. Provide evidence-based recommendations for education and training resources.

Methods

A structured telephone interview, guided by a questionnaire, was used to gather information concerning food defense practices from a national sample of school nutrition directors. The rationale for using an interview format for data collection was due to shared concerns that questions about food defense, presented via an online or paper survey instrument, would be perceived as one-and-the-same as typical food safety beliefs or internal efforts. Thus, interviews were conducted to clarify and discern as true as possible beliefs about food defense, on an individual basis, that were distinct from common food safety measures. The data later suggested that this concern (confusion about food safety vs. food defense) was in fact justified, and that interviews provided the necessary clarity about the aims of the study and questions at hand.

The staff at the Center for Food Safety in Child Nutrition Programs (the Center) and the USDA FNS Office of Food Safety (OFS) collaborated on the development of the questionnaire. The questions were designed and categorized to address the study objectives, with both quantitative and qualitative data gathered and analyzed. Figure 1 illustrates the methods utilized.

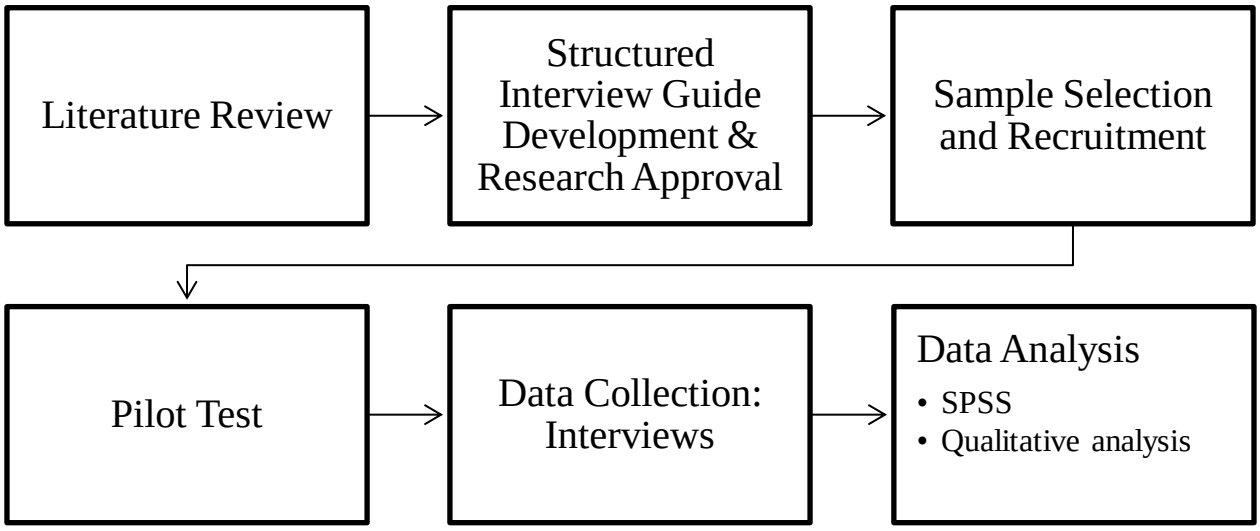

Figure 1. Methods: Food defense practices in school nutrition programs

Structured Interview Guide Development

Instrument development began with an in-depth literature review. The USDA FNS (2010) Food Defense Plan was used as a reference to develop a master list of questions. This was then compared to eight other instruments that were developed to explore food defense in foodservice operations (Department of Health and Human Services, US Food and Drug Administration, and Center for Food Safety and Applied Nutrition, 2001; Klitzke et al., 2016; Olds & Shanklin, 2014; Strohbehn, Sneed, Paez, & Beattie, 2007; USDA Food Safety and Inspection Services, 2016; USDA FNS, 2007; USDA FNS, 2012; Xirasagar, Kanwat, Smith, Li, Sros, & Schewchuk, 2010a; Yoon & Shanklin, 2007a). The research team categorized and reviewed each question. Redundant questions, questions about items not under the control of the school food authority (SFA), or questions related to food safety and not food defense were removed from the questionnaire. Probing questions were included to obtain more detailed responses about both school districts as a whole and school nutrition programs. The final set of

questions was then entered into Qualtrics®, an online survey and data management system, for data collection.

The instrument was developed in an online format and was intended to be used for the researcher to scribe and collect data via telephone. Because this was an unconventional approach, the research team reviewed and practiced the survey delivery multiple times, both in person and via remote video conference, as to emulate the actual data collection phase. A team member read each question from a satellite location to the other researchers, and changes were made to the survey to improve clarity and delivery.

Two pilot tests were conducted on the instrument. For the first pilot test, 28 randomly selected districts, two from each state chosen for the main study, were selected and contacted via email to request participation. An email reminder was sent after one week if no response was received. A week later, phone calls were made to each SFA selected. Of these, only two completed the interview. Due to the low response rate, a second pilot test was conducted, and 52 school districts were selected from a randomly selected state not included in the sample. This pilot test yielded an additional seven responses, for a total of nine responses in the pilot test. The pilot test resulted in minor changes to the questionnaire, and the methodology for the main study was revised: rather than contacting SFAs twice via email before following up with a phone call, the main study utilized a recruitment email, followed-up with a phone call, and a final email.

The final instrument included 10 sections: general facilities and personnel security, foodservice areas, food and supplies, external vendors, internal systems, water and ice supply, personnel training, food defense plan, suppliers, and general information about the school nutrition program and demographic information about the interviewee (see Appendix A). In the general facilities and personnel security section, participants were asked to refer to district-wide

practices when responding to the questions. The sections that included questions specific to the school nutrition program, participants were asked to respond to these questions for the school nutrition program as a whole.

Research Approval

Kansas State University's Institutional Review Board approved the research protocol before data were collected. All researchers involved in the study successfully completed mandatory human subjects training.

Sample Selection and Recruitment

To ensure a representative sample was selected among districts across the United States, two states from each of the seven USDA FNS regions were randomly selected for a total of 14 states. For each of the states selected, a list of all districts was download from the National Center for Education Statistics website (https://nces.ed.gov/ccd/districtsearch/). Based on previous studies (Basem, Roberts, Lin, & Sauer, 2019; Grisamore & Roberts, 2014; Roberts, Sauer, Paez, Shanklin, & Alcorn, 2018) that yielded a response rate of 10% to 14%, the goal was to select 145 districts from each state to achieve a minimum sample size of 280 districts (20 districts per state). Districts were then categorized by student enrollment (mega = ≥ 40,000 students, large = 20,000 to 39,999 students, medium = 2,500 to 19,999 students, and small ≤ 2,500 students). In order to assure districts of all sizes were included, and because there are only a few mega and large districts in each state, all mega and large school districts were invited to participate. The remaining number to total 145 were randomly selected, but divided equally between medium and small districts. In the instance a state had less than 145 school districts, all districts were invited to participate.

Contact information for the SFA in each district was obtained from USDA FNS Regional Offices with cooperation from the OFS. A random number generator was utilized to assign each school district on the National Center for Education Statistics list a number and then districts were sorted from lowest to highest based on this number. The number of districts needed to reach the sample size of 145 were selected from the top of the list. Contact information was then cross referenced on the list provided by USDA and any contact information not included on the USDA list was obtained from the website of the school district.

Data collection for each of the 14 states was staggered by approximately one week to allow time for researchers to conduct follow-up phone calls and interviews. An initial invitation was sent via email to the SFA with a letter explaining the purpose of the project (Appendix B). Once the SFA agreed to participate, a calendar invitation was sent with additional information and the scales to be used (Appendix C). A reminder was sent the day before the scheduled interview, and the scales to be used during the interview were again included (Appendix D). A thank you note and a copy of Creating your School Food Defense Plan guidance (USDA, 2012) was sent to each SFA that completed the interview (Appendix E). If an SFA declined to participate, they were immediately removed from the sample.

Approximately 7 to 10 days after the initial email, an attempt was made to contact each SFA who had not responded to the initial email via telephone to solicit their participation. The phone contact script is presented in Appendix F. Due to time constraints, only an average of 22% (SD ± 12.5%) were contacted via phone. Two weeks after the initial email, any SFA who had not yet replied was sent a follow-up email (Appendix F). Recruiting telephone calls to the SFAs ceased once the desired number of respondents from each state was achieved, while the follow-up email was sent to all SFAs who had not yet responded.

Data Analysis

The raw data set was imported from the Qualtrics survey system into SPSS. SPSS was utilized to run descriptive statistics including frequencies, percentages, and means. Summaries of specific comments or key themes were derived from the open-ended responses.

Results and Discussion

Response rate and sample description

A total of 320 interviews were planned and completed, representing 15% of the sample. Interviews averaged 33 minutes and ranged from 18 minutes to 86 minutes. While the response rate was low, it is similar to response rates for other research projects with a similar sample in recent years (Basem, Roberts, Lin, & Sauer, 2019; Grisamore & Roberts, 2014; Roberts, Sauer, Paez, Shanklin, & Alcorn, 2018). The lower response rate could also be a result of the survey being conducted via telephone interview late in the academic year. Figure 2 presents the number of school districts included in the sample from each of the seven USDA FNS regions as of the date the sample was selected (Fall 2018).

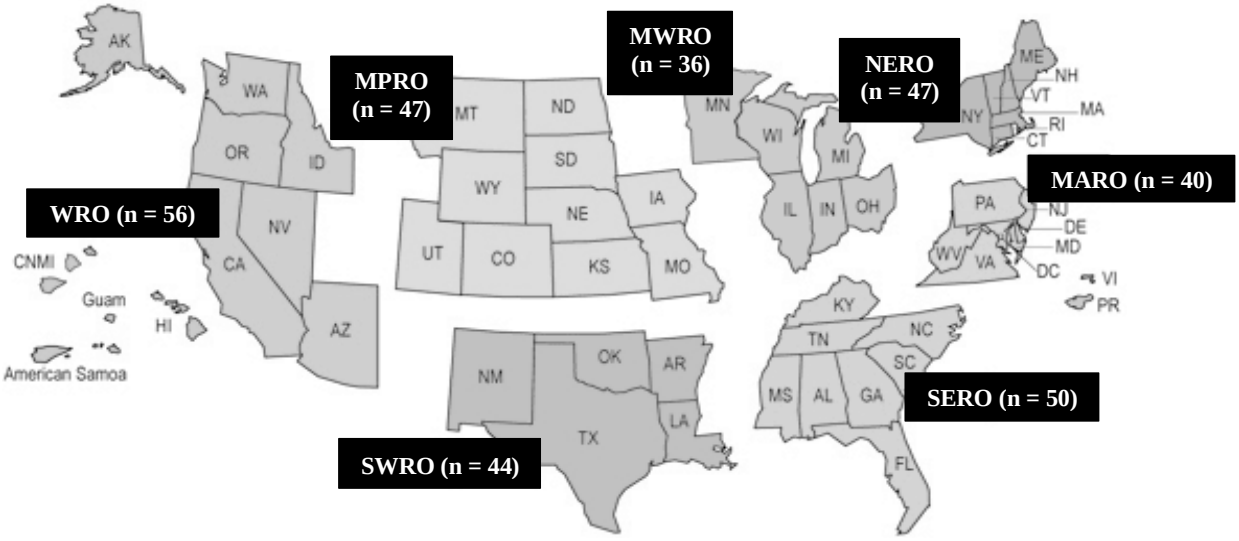

Figure 2. Number of School Districts Included in the Sample from each USDA FNS Region.

Demographics of the respondents are presented in Table 1. The majority of respondents have worked in foodservice for more than 20 years (61.9%) and in their current position for more than four years (67.8%).

Table 1. Respondent Demographics (N=320)

Respondent Demographics	Number (%)[a]
How long have you worked in any type of foodservice?	
Less than 1 year	5 (1.6)
1-3 years	5 (1.6)
4-7 years	19 (5.9)
8-12 years	26 (8.1)
13-20 years	64 (20.0)
Over 20 years	198 (61.9)
Years in your current position?	
Less than 1 year	27 (8.4)
1-3 years	73 (22.8)
4-7 years	103 (32.2)
8-12 years	44 (13.8)
13-20 years	40 (12.5)
Over 20 years	30 (9.4)
Have you ever received training about food defense?	
Yes	150 (46.9)
No	167 (52.2)
Title of person(s) interviewed	
School Nutrition Director / General Manager	247 (80.3)
School Nutrition Manager / Supervisor	26 (8.1)
School/District Administrative Personnel	21 (6.7)
School Nutrition Coordinator / Head Cook	13 (4.1)
School Nutrition Administrative Assistant	13 (4.1)
Nutrition Specialist / Dietitian	2 (1%)

[a] Percentages and totals may not equal 320 or 100% due to non-responses.

Table 2 presents a description of the district and school nutrition programs in the study. Almost half (46.1%) of the sample reported a district enrollment of 2,500 to 19,999 students, with 32.8% of districts having less than 2,500 students. The majority (50.6%) of the respondents indicated they had a well-documented crisis management plan.

Table 2. District and School Nutrition Program Demographics (N=320)			
	Number (%)[a]	**Operational Demographics**	**Number (%)[a]**
How many students are enrolled in your district?		***Average Number of Lunches Served***	
Less than 2,500 (Small)	105 (32.8)	Less than 1,000	79 (24.7)
2,500 – 19,999 (Medium)	157 (49.1)	1,000-4,999	144 (45.0)
20,000 – 39,999 (Large)	30 (9.4)	5,000-9,999	32 (10.0)
40,000 or more (Mega)	25 (7.8)	10,000-14,999	16 (5.0)
		15,000-19,999	14 (4.4)
Self-Operated vs. Contract		20,000 or more	24 (7.5)
Self-operated	261 (81.6)		
Contractor	56 (17.5)	***Number of employees in the School Nutrition Program?***	
Has your school nutrition program conducted a food defense audit?		Less than 10	51 (15.9)
		10 – 24 employees	58 (18.1)
No	276 (86.3)	24 – 25 employees	80 (25.0)
Yes, Internal audit	30 (9.4)	50 – 74 employees	38 (11.9)
Yes, external audit by government agency	10 (3.1)	75 – 99 employees	13 (4.1)
		100 - 149 employees	15 (4.7)
Yes, external audit by consulting company	3 (0.9)	Greater than 150	61 (19.1)
Does the school nutrition program have a crisis management plan?			
No	109 (31.4)		
Yes, and it is well documented	162 (50.6)		
Yes, but no written documents	40 (12.5)		

[a] Percentages and totals may not equal 320 or 100% due to non-responses.

General Facilities and Personnel Security

Table 3 summarizes the frequency of responses, means, and standard deviations for questions related to the security of general facilities and personnel within the district-wide school environment who may have access to the food supply. In most of the interviews, the majority of respondents indicated they always follow the practices outlined and in eight of the 10 occasions the score was above 4.0, indicating that the majority skewed towards always doing the practice outlined. Additionally, 61.6% indicated they never allow vendor access to their facilities after

hours. In instances where food deliveries are allowed after hours, common products delivered included dairy (23.8%), bread (9.7%), broadline or grocery orders (7.2%), or produce (3.1%).

An open-ended question probed what occurs if a foodservice staff member observes an unauthorized person in a restricted area. Twenty-nine of the respondents (9.1%), indicated they did not know or were not aware what the protocol would be. The most common response (138 of 494 responses) was to alert the police, school security, administration, or other school staff.

An additional open-ended question probed who ensures that terminated employees lose all means of immediate access to the facility. Of the 320 respondents, 45% indicated the administration or district office oversees this practice. Other responses included the maintenance department (39.7%), department heads (23.4%), school police or security (21.5%), or other district departments (human resources, technology, safety, risk management; 27.2%). Seven (2.2%) of the respondents indicated they did not know who monitors this policy.

Foodservice Areas

Table 4 summarizes the frequency of responses, means, and standard deviations for questions related to the security of the foodservice areas within the school buildings. All of the means in this area were above 4.0. For the practice of having an emergency lighting system within the foodservice area, less than 15% of respondents indicated they sometimes, rarely, or never had this in their district. Greater than two-thirds of all respondents always followed the practices outlined in this area, with the exception of securing the foodservice area during the school day to prevent entry by unauthorized persons. Only 58.4% indicated this was always done. In 7.2% of the districts this was never or rarely done. In 6.9% of the districts, the

Table 3. General Facilities and Personnel Security (N=320)

	Frequency (%) [a]							
	Never	Rarely	Sometimes	Often	Always	Not Sure	Not Applicable	Mean ± SD [b]
Secures the school buildings during the school day to prevent entry by unauthorized persons.	1 (0.3)	2 (0.6)	8 (2.5)	39 (12.2)	268 (83.8)	2 (0.6)	0 (0)	4.8 ± 0.5
Accounts for facility access such as entry codes and keys provided to current employees.	3 (0.9)	2 (0.6)	9 (2.8)	24 (7.5)	270 (84.4)	12 (3.8)	0 (0)	4.8 ± 0.6
Secures the school buildings after hours and on weekends to prevent entry by unauthorized persons.	3 (0.9)	0 (0)	11 (3.4)	35 (10.9)	254 (79.4)	16 (5.0)	0 (0)	4.8 ± 0.6
Ensures that terminated employees lose all means of immediate access to the facility.	0 (0)	1 (0.3)	5 (1.6)	34 (10.6)	246 (76.9)	28 (8.8)	0 (0)	4.8 ± 0.4
Identifies and responds to unauthorized individuals in restricted areas.	1 (0.3)	2 (0.6)	11 (3.4)	47 (14.7)	236 (73.8)	21 (6.6)	1 (0.3)	4.7 ± 0.6
Marks all keys as 'Do Not Duplicate'.	14 (4.4)	4 (1.3)	16 (5.0)	29 (9.1)	226 (70.6)	18 (5.6)	13 (4.1)	4.6 ± 1.0
Restricts access to the chemical supplies throughout the school.	12 (3.8)	6 (1.9)	23 (7.2)	46 (14.4)	193 (60.3)	39 (12.2)	0 (0)	4.4 ± 1.0
Secures school grounds during the school day to prevent entry by unauthorized persons.	48 (15.0)	9 (2.8)	19 (5.9)	46 (14.4)	192 (60)	20 (6.3)	1 (0.3)	4.0 ± 1.5
Secures school grounds after hours and on weekends to prevent entry by unauthorized persons.	51 (15.9)	12 (3.8)	27 (8.4)	46 (14.4)	163 (50.9)	20 (6.3)	1 (0.3)	3.9 ± 1.5
Allows vendors to access the school buildings after hours.	197 (61.6)	27 (8.4)	63 (19.7)	12 (3.8)	12 (3.8)	7 (2.2)	0 (0)	1.8 ± 1.1

[a] Percentages and totals may not equal 320 or 100% due to non-responses.
[b] Responses were coded as never = 1, rarely = 2, sometimes = 3, often = 4, always = 5. Not sure and not applicable responses were not included in the overall mean and standard deviation calculation.

Table 4. Foodservice Area Security (N=320)

	Frequency (%)[a]							
	Never	Rarely	Sometimes	Often	Always	Not Sure	Not Applicable	Mean ± SD [b]
Secures the foodservice area after hours and on weekends to prevent entry by unauthorized persons.	2 (0.6)	2 (0.6)	14 (4.4)	20 (6.3)	279 (87.2)	2 (0.6)	1 (0.3)	4.8 ± 0.6
Has a secured entrance for employees.	6 (1.9)	4 (1.3)	14 (4.4)	11 (3.4)	283 (88.4)	1 (0.3)	1 (0.3)	4.8 ± 0.8
Prohibits personal items (like purse, phone, etc.), outside foods, and medications in foodservice production areas.	17 (5.3)	5 (1.6)	21 (6.6)	27 (8.4)	247 (77.2)	2 (0.6)	1 (0.3)	4.5 ± 1.1
Has an emergency lighting system in the foodservice area.	24 (7.5)	2 (0.6)	21 (6.6)	17 (5.3)	214 (66.9)	41 (12.8)	1 (0.3)	4.4 ± 1.2
Secures the foodservice area during the school day to prevent entry by unauthorized persons.	13 (4.1)	10 (3.1)	37 (11.6)	72 (22.5)	187 (58.4)	0 (0)	1 (0.3)	4.3 ± 1.1

[a] Percentages and totals may not equal 320 or 100% due to non-responses.
[b] Responses were coded as never = 1, rarely = 2, sometimes = 3, often = 4, always = 5. Not sure and not applicable responses were not included in the overall mean and standard deviation calculation.

prohibition of personal items, outside foods, and medications in foodservice production areas is never or rarely done.

When asked how access was restricted to the foodservice areas, 50% of the school district representatives indicated they lock foodservice areas to restrict access; 27.5% indicated they always lock external doors; only 6.3% reported they lock internal doors, except during service; and 6.9% stated they lock internal doors when staff is not present. Thirty respondents (9.4%) indicated they do not lock internal doors.

When asked what would occur if an unauthorized person was located in a foodservice area, many of the respondents (31.6%) noted that the person would be redirected or asked to leave, 18.4% indicated they would ask what the person needed, 12.2% reported they would escort the person out of the area or building, 11.9% indicated they would call security, and 10.3% they would call the principle or administrator. Thirteen respondents (4.1%) indicated that it would not be possible that an unauthorized individual would be in the foodservice area or that they wouldn't allow such a thing to occur.

Table 5 summarizes the frequency of responses, means, and standard deviations for questions related to monitoring the foodservice areas within the school buildings. The lowest category in this area, with a mean response of 3.0 (± 1.8), was monitoring the district foodservice areas with an alarm. Greater than 37% indicated that this was never done. Districts often utilize camera systems rather an alarm system (mean = 3.5 ± 1.5).

Table 5. Monitoring of Foodservice Areas (N=320)

	Frequency (%)[a]							
	Never	Rarely	Sometimes	Often	Always	Not Sure	Not Applicable	Mean ± SD [b]
Monitors the **main service line** for signs of suspicious activity or unauthorized entry.	0 (0)	1 (0.3)	14 (4.4)	40 (12.5)	263 (82.2)	1 (0.3)	1 (0.3)	4.8 ± 0.5
Monitors the **food preparation area** for signs of suspicious activity or unauthorized entry.	1 (0.3)	4 (1.3)	13 (4.1)	43 (13.4)	254 (79.4)	1 (0.3)	4 (1.3)	4.7 ± 0.6
Monitors the **equipment** for signs of suspicious activity or unauthorized entry.	0 (0)	6 (1.9)	19 (5.9)	44 (13.8)	249 (77.8)	1 (0.3)	1 (0.3)	4.7 ± 0.7
Monitors the **inside storage** for signs of suspicious activity or unauthorized entry.	1 (0.3)	6 (1.9)	16 (5.0)	50 (15.6)	242 (75.6)	1 (0.3)	4 (1.3)	4.7 ± 0.7
Monitors the **student dining area** for signs of suspicious activity or unauthorized entry.	1 (0.3)	6 (1.9)	25 (7.8)	35 (10.9)	237 (74.1)	5 (1.6)	11 (3.4)	4.6 ± 0.7
Monitors the **self-service bar** for signs of suspicious activity or unauthorized entry.	1 (0.3)	3 (0.9)	18 (5.6)	47 (14.7)	187 (58.4)	0 (0)	64 (20.0)	4.6 ± 0.7
Monitors the **outside storage** for signs of suspicious activity or unauthorized entry.	1 (0.3)	2 (0.6)	10 (3.1)	23 (7.2)	92 (28.8)	1 (0.3)	189 (59.1)	4.6 ± 0.8
Monitors the **receiving docks** for signs of suspicious activity or unauthorized entry.	3 (0.9)	4 (1.3)	36 (11.3)	53 (16.6)	212 (66.3)	2 (0.6)	10 (3.1)	4.5 ± 0.8
Requires that at least one authorized employee is present in the foodservice area at all times when the area is not locked.	16 (5.0)	7 (2.2)	23 (7.2)	31 (9.7)	235 (73.4)	2 (0.6)	6 (1.9)	4.5 ± 1.1
Prohibits foodservice areas from being used for special events/public events unless foodservice staff are present to monitor/supervise.	18 (5.6)	6 (1.9)	41 (12.8)	42 (13.1)	207 (64.7)	1 (0.3)	4 (1.3)	4.3 ± 1.1
Monitors the areas using security cameras.	58 (18.1)	26 (8.1)	77 (24.1)	19 (5.9)	134 (41.9)	5 (1.6)	1 (0.3)	3.5 ± 1.5
Monitors the areas using an alarm system.	120 (37.5)	12 (3.8)	35 (10.9)	18 (5.6)	124 (38.8)	10 (3.1)	1 (0.3)	3.0 ± 1.8

[a] Percentages and totals may not equal 320 or 100% due to non-responses.
[b] Responses were coded as never = 1, rarely = 2, sometimes = 3, often = 4, always = 5. Not sure and not applicable responses were not included in the overall mean and standard deviation calculation.

When the 255 respondents, who reported that cameras were used in the school buildings, were questioned if the cameras were actively monitored, 56.1% indicated they were, 31.4% indicated they were not, and 12.5% were unsure. Of those who had a camera, the majority (92.5%) indicated the footage was recorded, while the remaining 7.5% were unsure.

Table 6 presents data related to the frequency with which camera footage is reviewed and who is able to review it within the facility. The majority of cameras (53.7%) are reviewed as needed by the school administration (30.2%) or security (16.1%).

Table 6. Surveillance Camera Information: Frequency of Review & Who has Access (n=255)

Item	Number (%)[a]
How Frequently are the Recordings Reviewed?	
As needed	137 (53.7)
Daily	12 (4.7)
Frequently/Often	7 (2.7)
Weekly	3 (1.2)
Rarely	1 (0.4)
Never	1 (0.4)
No Frequency provided	1 (0.4)
Unsure	70 (27.5)
Who Reviews the Footage?	
Administration/Principal/Superintendent	77 (30.2)
Security/School Police	41 (16.1)
Maintenance/Operations/Custodial	37 (14.5)
Department Heads/Nutrition Director	34 (13.3)
Information Technology Department	26 (10.2)
Town/City Police Department	4 (1.6)
Human Resources	4 (1.6)
Risk Management	2 (0.8)
Outside Contractor	1 (0.4)
No person identified	25 (9.8)
Unsure	36 (14.1)

[a] Percentages and totals may not equal 320 or 100% due to non-responses.

The most common location of cameras was at exterior entrances or the loading dock (39.6%), followed by the dining areas (39.2%), serving lines (27.1%), and in the kitchens (13.3%). Other common areas where cameras were noted to be placed included interior doors to foodservice areas (11.8%), outside areas (11.8%), building hallways (11.4%), at the cash register or point-of-sale systems (9.8%), and production areas (8.6%). For each foodservice area that the respondent indicated was monitored, a follow-up question was asked to determine which monitoring technique was utilized, in-person or via camera. Results for this are presented in Table 7.

Table 7. Monitoring Methods for Foodservice Areas (N=320)

	Frequency (%)[a]		
Foodservice Area	**In-Person**	**By Surveillance Camera**	**By Other Means**
Receiving dock	231 (72.2)	210 (65.6)	4 (1.3)[1]
Outside storage	87 (27.2)	75 (23.4)	9 (2.8)[2]
Inside storage	299 (93.4)	102 (31.9)	7 (2.2)[3]
Food preparation area	305 (95.3)	80 (25.0)	0 (0)
Equipment	311 (97.2)	59 (18.4)	2 (0.6)[4]
Main service line	310 (96.9)	116 (36.3)	0 (0)
Self-service bar	251 (78.4)	77 (24.1)	0 (0)
Student dining area	290 (90.6)	180 (56.3)	0 (0)

[a] Percentages and totals may not equal 320 or 100% due to non-responses.
[1] Alarm (1), Undisclosed (3)
[2] Locks (5), Alarm (1), Temperature Monitor (1), Undisclosed (2)
[3] Inventory (1), Alarm (1), Locks (4), Undisclosed (1)
[4] Locks (1), Sensors (1)

Food and Supplies

The majority of respondents (86.6%) reported restricted access to internal cold or frozen areas, and 84.1% reported restricted access to dry storage areas; both had mean scores of 4.8 (± 0.6) (Table 8). Only 31.3% of respondents indicated they restrict access to external frozen and cold storage areas, and the question was not applicable to 62.8% of the respondents who did not have external storage areas. The lowest mean in this category was related to monitoring of the water supply and ice makers within the school nutrition program.

When questioned about who has access to internal and external storage areas—outside of school foodservice staff—respondents indicated custodians and maintenance have the greatest access to the internal cold, frozen, and dry storage areas, followed by building principals (Table 9). The number of school nutrition programs that allow access to external frozen and cold storage areas (n=7) was less than those with access to these storage facilities inside the building (n=18). When asked to define who each respondent defined as "other", answers ranged from anyone in the district to specific individuals within the school system, such as superintendents, business managers, school nurses, operations team, coaches, etc. Additional individuals who sometimes had access to storage facilities included vendors, cleaning companies, pest control, and afterschool snack staff.

External Purchases

The majority of respondents reported using national (60.0%) and regional (56.8%) suppliers, while a little less than one-third (30.3%) reported using local suppliers. Of the 320 respondents, 41.9% indicated they used between two and five suppliers, while only 30.9% use six to nine suppliers, and 19.0% use 10 or more. A few (4.7%) use only one supplier. Approximately 63.8% of respondents were not aware if their supplier had a food defense plan in place.

Table 10 presents data related to food security when purchasing food from external vendors. The majority (97.8%) purchase food ingredients, food products, packaging materials, and other foodservice supplies only from approved vendors, which had a mean score of 5.0 (± 0.2). Many of the respondents indicated they rejected unscheduled deliveries with a mean of 4.4 (± 1.0).

Table 8. Food & Supplies (N=320)

	Frequency (%)[a]							
	Never	Rarely	Sometimes	Often	Always	Not Sure	Not Applicable	Mean ± SD [b]
Restricts access to external School Nutrition Program cold or frozen food storage areas to designated employees only.	0 (0)	1 (0.3)	6 (1.9)	10 (3.1)	100 (31.3)	1 (0.3)	201 (62.8)	4.8 ± 0.6
Restricts access to internal School Nutrition Program cold or frozen areas to designated employees only.	3 (0.9)	3 (0.9)	12 (3.8)	23 (7.2)	277 (86.6)	0 (0)	2 (0.6)	4.8 ± 0.6
Restricts access to the School Nutrition Program dry storage areas to designated employees only.	3 (0.9)	0 (0)	10 (3.1)	30 (9.4)	269 (84.1)	0 (0)	4 (1.3)	4.8 ± 0.6
Monitors water supply that is transported or provided in the cafeteria.	8 (2.5)	5 (1.6)	13 (4.1)	19 (5.9)	207 (64.7)	12 (3.8)	56 (17.5)	4.6 ± 0.9
Restricts access to ice machines.	13 (4.1)	5 (1.6)	25 (7.8)	35 (10.9)	157 (49.1)	1 (0.3)	82 (25.6)	4.4 ± 1.1
Monitors water supply that is transported or provided for field trips.	8 (2.5)	2 (0.6)	23 (7.2)	6 (1.9)	92 (28.8)	26 (8.1)	163 (50.9)	4.3 ± 1.2

[a] Percentages and totals may not equal 320 or 100% due to non-responses.
[b] Responses were coded as never = 1, rarely = 2, sometimes = 3, often = 4, always = 5. Not sure and not applicable responses were not included in the overall mean and standard deviation calculation.

Table 9. Who has Access to Food Storage Areas (N=320)

	Frequency (%)[a]						
	Principals	Teachers	Custodians	Maintenance	Volunteers	Visitors	Other School Personnel
External cold or frozen food storage areas	44 (13.8)	5 (1.6)	57 (17.8)	97 (30.3)	6 (1.9)	1 (0.3)	27 (8.4)
Internal cold or frozen areas	136 (42.5)	25 (7.8)	157 (49.1)	235 (73.4)	9 (2.8)	4 (1.3)	56 (17.5)
Dry storage areas	144 (45)	25 (7.8)	168 (52.5)	219 (68.4)	9 (2.8)	6 (1.9)	55 (17.2)

[a] Percentages and totals may not equal 320 or 100% due to non-responses.

Table 10. Purchases from Vendors (N=320)

	Frequency (%)[a]							
	Never	Rarely	Sometimes	Often	Always	Not Sure	Not Applicable	Mean ± SD [b]
Purchases all food ingredients, food products, packaging materials, and other foodservice supplies only from approved vendors.	0 (0)	1 (0.3)	0 (0)	3 (0.9)	313 (97.8)	1 (0.3)	2 (0.6)	5.0 ± 0.2
Addresses a recall situation within 12 hours.	0 (0)	0 (0)	0 (0)	16 (5.0)	297 (92.8)	2 (0.6)	5 (1.6)	5.0 ± 0.2
Verifies external deliveries against purchase orders.	0 (0)	1 (0.3)	7 (2.2)	26 (8.1)	285 (89.1)	0 (0)	1 (0.3)	4.9 ± 0.4
Rejects products that have been opened or otherwise compromised.	0 (0)	0 (0)	5 (1.6)	30 (9.4)	280 (87.5)	0 (0)	2 (0.6)	4.9 ± 0.4
Inspects food packages for evidence of tampering upon delivery.	1 (0.3)	1 (0.3)	13 (4.1)	47 (14.7)	255 (79.7)	2 (0.6)	1 (0.3)	4.7 ± 0.6
Rejects unscheduled deliveries.	4 (1.3)	15 (4.7)	36 (11.3)	31 (9.7)	180 (56.3)	14 (4.4)	40 (12.5)	4.4 ± 1.0

[a] Percentages and totals may not equal 320 or 100% due to non-responses.
[b] Responses were coded as never = 1, rarely = 2, sometimes = 3, often = 4, always = 5. Not sure and not applicable responses were not included in the overall mean and standard deviation calculation.

All school nutrition programs either always or often address recalls within 12 hours of receiving notification (mean = 5.0 ± 0.2). When asked what type of recalled products they had to respond to in the last 12 months, almost half (47.8%) were involved in the romaine lettuce recall. Others indicated they were involved in a chicken (22.2%) or beef product (6.3%) recall. Almost a quarter of the sample (23.8%) indicated they had not been involved in a recall within the last 12 months, while nine respondents (2.8%) were unsure if their school district was involved in a recall.

Intra-School Deliveries

Table 11 presents data related to district intra-school deliveries. When transporting food and food packages between school buildings, central kitchens, or district warehouses, the majority (60.0%) of school districts inspect packages for evidence of tampering with a mean of 4.8 (± 0.6).

The lowest mean in this category was tracking of district delivery trucks in real time while en route with deliveries between school buildings (2.0 ± 1.7); 46.3% of the overall respondents never do this, representing almost 70% of those districts who handle deliveries between buildings. When asked how delivery trucks were tracked, 17.1% of those who utilize delivery trucks use GPS, while others mentioned the use of scheduled delivery times, delivery locks, computer programs, or telephone.

Table 11. Intra-school Deliveries (N=320)

	Frequency (%)[a]							
	Never	**Rarely**	**Sometimes**	**Often**	**Always**	**Not Sure**	**Not Applicable**	**Mean ± SD [b]**
Inspects food packages for evidence of tampering.	1 (0.3)	2 (0.6)	8 (2.5)	28 (8.8)	192 (60.0)	5 (1.6)	84 (26.3)	4.8 ± 0.6
Verifies inter-school deliveries against order	6 (1.9)	4 (1.3)	8 (2.5)	25 (7.8)	187 (58.4)	3 (0.9)	87 (27.2)	4.7 ± 0.8
Secures school delivery trucks when not being loaded or unloaded.	8 (2.5)	6 (1.9)	10 (3.1)	27 (8.4)	152 (47.5)	20 (6.3)	97 (30.3)	4.5 ± 1.0
Rejects unscheduled deliveries.	6 (1.9)	21 (6.6)	30 (9.4)	25 (7.8)	105 (32.8)	6 (1.9)	127 (39.7)	4.1 ± 1.2
Designates employees trained on food defense to deliver the food.	48 (15.0)	10 (3.1)	20 (6.3)	14 (4.4)	132 (41.3)	14 (4.4)	82 (25.6)	3.8 ± 1.7
Tracks school delivery trucks in real time while en route.	148 (46.3)	4 (1.3)	6 (1.9)	9 (2.8)	43 (13.4)	12 (3.8)	98 (30.6)	2.0 ± 1.7

[a] Percentages and totals may not equal 320 or 100% due to non-responses.
[b] Responses were coded as never = 1, rarely = 2, sometimes = 3, often = 4, always = 5. Not sure and not applicable responses were not included in the overall mean and standard deviation calculation.

Personnel Training

Table 12 presents data related to training provided by the school nutrition staff to employees and non-foodservice staff. Approximately one-third (30%) of all school nutrition programs surveyed have not trained foodservice staff on food defense topics, while 33.1% reported always training their staff on food defense practices. The majority of districts (62.5%) provide no training to non-foodservice staff, such as custodial staff and administrators.

When asked why training was not provided specifically on food defense practices, the most common response, from approximately 15% of the sample, was that food safety training was provided and includes food defense practices. Approximately 10% of respondents indicated they had not considered the need for it. Other responses indicated it was not a priority; they don't allow access to the kitchen or food, so it was not necessary; it was not required; the respondent was not sure what it was; or they denied that something could actually happen in their school district.

Outside of foodservice staff, training was provided most commonly to administration (22.8%), custodians/maintenance (7.8%), and teachers (6.8%). Topics covered most frequently included access to the kitchen, food safety information, reasons access is limited to the kitchen, and general policies and procedures.

Table 12. Personnel Training (N=320)

	Frequency (%)[a]							
	Never	**Rarely**	**Sometimes**	**Often**	**Always**	**Not Sure**	**Not Applicable**	**Mean ± SD [b]**
Trains all foodservice employees on food defense	96 (30.0)	46 (14.4)	40 (12.5)	23 (7.2)	106 (33.1)	8 (2.5)	1 (0.3)	3.0 ± 1.7
Provides information about the importance of food defense to non-foodservice staff.	200 (62.5)	46 (14.4)	40 (12.5)	14 (4.4)	13 (4.0)	7 (2.2)	0 (0)	1.7 ± 1.1

[a] Percentages and totals may not equal 320 or 100% due to non-responses.
[b] Responses were coded as never = 0, rarely = 1, sometimes = 2, often = 3, always = 4. Not sure and not applicable responses were not included in the overall mean and standard deviation calculation.

Food Defense Plan

Of the 320 respondents, 216 (67.5%) reported that they did not have a district-wide food defense plan to protect food available to students that is beyond the school nutrition program's control, such as vending machines, fundraisers, classrooms, and other events. Only 28 respondents (8.8%) indicated that they had a district-wide food defense plan, and 76 (23.8%) were unsure if a food defense plan existed for their district.

Slightly more (96 or 30%) had a food defense plan in place specific to their school nutrition program, while 212 (66.3%) did not have a school nutrition program food defense plan in place. When asked why a food defense plan was not in place, the most common answer was that the respondent had never thought about it.

Only 20 of the 230 districts reported having a food defense team. Of these, 100% included the school nutrition director, 75% included administrators, 55% included school or community police, and 50% included school nurses. Others included school maintenance staff (45%), teachers (30%), parents (30%), local public health officials (25%), and fire department representatives (10%). None of the 20 food defense teams included students.

Responding to an Incident

If an act of intentional contamination or tampering were to occur, 44.7% of respondents indicated they would remove or discard the product in question, 40.1% indicated they would contact administration, and 26.9% indicated they would contact the school nutrition director.

When respondents were asked the most important thing they would do in their district to prevent an act of intentional contamination, 27.5% indicated training and education, and the same percentage indicated keeping the space and operation secure. Slightly fewer (25%)

indicated monitoring and 17.2% indicated simply being aware of what was occurring in their district.

Level of Confidence

Respondents were asked to provide their level of confidence that they could address a food recall, that their school nutrition program could effectively respond to an intentional contamination incident, that their school district as a whole can effectively respond to an intentional contamination incident, that their school nutrition program's food defense plan would prevent an intentional contamination incident, and that their school district's food defense plan would prevent an intentional contamination incident. Responses are included in Table 13. Participants were very confident or extremely confident that their district and school nutrition program's food defense plan would prevent an intentional contamination incident and that they could address a food recall.

Table 13. Respondents' Level of Confidence in their Food Defense Program

Item [a]	Frequency (%)[b]					Mean ± SD [c]
	Not Confident	Somewhat Confident	Confident	Very Confident	Extremely Confident	
…your school district's food defense plan would prevent an intentional contamination incident? (n=27)	0 (0)	3 (11.1)	4 (14.8)	6 (22.2)	14 (51.9)	4.2 ± 1.1
…your school nutrition program's food defense plan would prevent an intentional contamination incident? (n=96)	2 (2.1)	9 (9.4)	14 (14.6)	23 (24.0)	48 (50)	4.1 ± 1.1
…you can address a recall due to intentional contamination (n=15)	2 (0.6)	15 (4.8)	61 (19.4)	135 (42.9)	102 (32.4)	4.0 ± 0.9
…your school district as a whole can effectively respond to an intentional contamination incident? (n=319)	9 (2.8)	69 (21.6)	37 (11.6)	101 (31.7)	103 (32.3)	3.9 ± 1.1
…your school nutrition program can effectively respond to an intentional contamination incident? (n=320)	3 (0.9)	46 (14.4)	52 (16.3)	91 (28.5)	127 (39.8)	3.7 ± 1.2

[a] The stem, "*what is your level of confidence that…*" was used for all responses.
[b] Percentages and totals may not equal 320 or 100% due to non-responses.
[c] Responses were coded as not confident = 1, somewhat confident = 2, confident = 3, very confident = 4, and extremely confident = 5.

Conclusions and Recommendations

Conclusions

The results of this study suggest that many school nutrition programs have room to improve food defense programs in their districts. Almost 68% of districts and 66% of school nutrition programs have a fully implemented food defense plan. However, many of the school nutrition programs have implemented components of a food defense plan as part of their overall food safety program and many of the respondents were *confident*, *very confident*, or *extremely confident* that their program or district could respond to a food defense related incident. Fundamentally, one could conclude that school nutrition programs mostly rely on existing HACCP-based food safety guidelines to also ensure that potential intentional contamination situations are under control.

The food system that ensures a consistent flow of food to the school nutrition programs—defined for this study as growth, harvest, manufacturing, packaging, storage, and transportation—has adopted means and policies to control intentional food contamination (USDA Food Safety and Inspection Service, 2019). It is imperative that school nutrition programs link to these predicate standards to provide a continuum of risk reduction and best practice for overall safety.

Operationally, while the opportunity for an intentional contamination incident is evident in several areas, overall practices to prevent an intentional food defense incident were strong. Training was lacking across the sample, in both training of foodservice staff on food defense and providing information to non-foodservice staff who are integral in ensuring the defense of food throughout the entire school system. Many of the respondents viewed food safety and food

defense as co-aligned topics: when asked what type of food defense topics were included in training, food safety topics were often brought up, even when reminded of the differences between the two topics.

Recommendations

The Center proposes the following categorical recommendations:

- While overall practices suggest that risks pertaining to food defense are present, additional insight could be gained from on-site observations to audit the practices outlined in this study. Practices deemed strong and those where opportunities for improvement were evident could both be explored as to determine if risk has truly been minimized to the best extent possible.
- The Center has built a sustained record in the area of behavior assessment specific to core food safety practices. Similar research could be conducted on food defense practices, especially those that overlap with existing food safety standards, to determine the strength of minimizing risk at the level of actual employee behaviors versus assumed or sought-after behaviors.
- Research about food defense practices could be conjoined with existing food safety training strategies and relevant behavioral interventions to enhance training efficiency.
- Food defense lends itself to mock on-site situations, or a study of simulated events, to determine the actual readiness and awareness of staff in a response situation. Said research in this area could focus on the readiness of school nutrition staff or a broader array of stakeholders in the school environment.

- Clearly delineate between food safety and food defense in training for school nutrition personnel. While the topics are co-aligned, specific plans should be put in place to protect the food supply within the district.

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Appendix A:

Food Defense Questionnaire

INTRODUCTION

Interview Identification Number: _____

Interviewer Identification Number:_____

Remember to record the interview.

Hello, my name is _____ with the Center for Food Safety in Child Nutrition Programs at Kansas State University. Thank you for agreeing to participate in this interview. Your completion of the interview will serve as your consent.

The purpose of this research study is to investigate practices to prevent deliberate or intentional acts of contamination or tampering of food in school nutrition programs. During this interview, I will be asking questions related to food defense practices for your district and school nutrition program.

Please feel free to take your time and answer all questions openly and honestly. If you do have any questions during the interview, let me know. If you do not feel comfortable answering a question, let me know and we can skip that question.

I will be sharing a screen with you that will have useful information for the interview. The slide will include the food defense definition used in this study and the scale for the questions. This interview guide has a total of 10 sections. As a reminder we are recording this interview.

Do you have any questions before we start?

Start Time: _____

1. GENERAL FACILITIES AND PERSONNEL SECURITY

The first section of the interview will be "General Facilities and Personnel Security", on this section we will be asking 10 questions.

Considering your district as a whole and greatest areas of weakness for food defense (the protection of the food supply from deliberate or intentional acts of contamination or tampering), tell me how often (never, rarely, sometimes, often, always) your **school district** does the following:

	Never	Rarely	Sometimes	Often	Always	Not Sure	Not Applicable
1.1. Secures **school grounds** during the **school day** to prevent entry by unauthorized persons.							
1.2. Secures **school grounds after hours and on weekends** to prevent entry by unauthorized persons.							
1.3. Secures the **school buildings during the school day** to prevent entry by unauthorized persons.							
1.4. Secures the **school buildings after hours and on weekends** to prevent entry by unauthorized persons.							
1.5. Allows vendors to access the school buildings **after hours**.							

1.5.1 Could you provide examples of when vendors can access the school buildings after hours? (*Note: Question was only asked if the response to question 1.5 was rarely, sometimes, often, or always.*)

1.5.2. What type of products are being delivered after hours? (*Note: Question was only asked if the response to question 1.5 was rarely, sometimes, often, or always.*)

	Never	Rarely	Sometimes	Often	Always	Not Sure	Not Applicable
1.6. Restricts access to the chemical supplies throughout the school (e.g. by locked door/gate).							
1.7. Identifies and responds to unauthorized individuals in restricted areas.							

1.7.1. What plans are in place if an unauthorized individual is found in restricted areas? (*Note: Question was only asked if the response to question 1.7 was rarely, sometimes, often, or always.*)

	Never	Rarely	Sometimes	Often	Always	Not Sure	Not Applicable
1.8. Accounts for facility access such as entry codes and keys provided to current employees.							
1.9. Marks all keys as 'Do Not Duplicate'.							
1.10. Ensures that terminated employees lose all means of immediate access to the facility (keys, passwords).							

1.10.1. In general, who is responsible for monitoring these practices?

2. FOODSERVICE AREAS

Considering your district as a whole and greatest areas of weakness for food defense (the protection of the food supply from deliberate or intentional acts of contamination or tampering), tell me how often (never, rarely, sometimes, often, always) your school nutrition program does the following:

	Never	Rarely	Sometimes	Often	Always	Not Sure	Not Applicable
2.1. Secures the foodservice area (e.g., by locks, seals, or sensors) during the school day to prevent entry by unauthorized persons.							

2.1.1 How are they restricted? (Locks). (*Note: Question was only asked if the response to question 2.1 was rarely, sometimes, often, or always.*)

2.1.2 What actions are taken if an unauthorized employee is found in the foodservice production area? (*Note: Question was only asked if the response to question 2.1 was rarely, sometimes, often, or always.*)

	Never	Rarely	Sometimes	Often	Always	Not Sure	Not Applicable
2.2 Secures the foodservice area (e.g., by locks, seals, or sensors) **after hours and on weekends** to prevent entry by unauthorized persons.							
2.3 Monitors the areas using security cameras.							

2.3.1 Are those cameras actively monitored? (*Note: Question was only asked if the response to question 2.3 was rarely, sometimes, often, or always.*)

- ❑ Yes
- ❑ No
- ❑ Not Sure

2.3.2 Is the footage recorded? (*Note: Question was only asked if the response to question 2.3 was rarely, sometimes, often, or always.*)

- ❑ Yes
- ❑ No
- ❑ Not Sure

2.3.2.1 How frequently are the recordings reviewed and by whom? (*Note: Question was only asked if the response to question 2.3.2 was yes.*)

2.3.3 Where in the operation are the cameras located? (*Note: Question was only asked if the response to question 2.3 was rarely, sometimes, often, or always.*)

	Never	Rarely	Sometimes	Often	Always	Not Sure	Not Applicable
2.4 Monitors the areas using an alarm system.							
2.3 Monitors the areas using security cameras.							
2.5 Has a secured entrance for employees.							
2.6 Prohibits personal items (like purse, phone, etc.), outside foods, and medications in foodservice production areas.							
2.7 Requires that at least one authorized employee is present in the foodservice area at all times when the area is not locked.							
2.8 Monitors the receiving docks for signs of suspicious activity or unauthorized entry.							

2.8.1 How are they monitored? (*Note: Question was only asked if the response to question 2.8 was rarely, sometimes, often, or always.*)

- ❑ In person
- ❑ By camera
- ❑ Other _____

	Never	Rarely	Sometimes	Often	Always	Not Sure	Not Applicable
2.9 Monitors the outside storage for signs of suspicious activity or unauthorized entry.							

2.9.1 How are they monitored? (*Note: Question was only asked if the response to question 2.9 was rarely, sometimes, often, or always.*)

- ❑ In person
- ❑ By camera
- ❑ Other _____

	Never	Rarely	Sometimes	Often	Always	Not Sure	Not Applicable
2.10 Monitors the inside storage for signs of suspicious activity or unauthorized entry.							

2.10.1 How are they monitored? (*Note: Question was only asked if the response to question 2.10 was rarely, sometimes, often, or always.*)

- ❑ In person
- ❑ By camera
- ❑ Other _____

	Never	Rarely	Sometimes	Often	Always	Not Sure	Not Applicable
2.11 Monitors the food preparation area for signs of suspicious activity or unauthorized entry.							

2.11.1 How are they monitored? (*Note: Question was only asked if the response to question 2.11 was rarely, sometimes, often, or always.*)

- ❑ In person
- ❑ By camera
- ❑ Other _____

	Never	Rarely	Sometimes	Often	Always	Not Sure	Not Applicable
2.12 Monitors the equipment for signs of suspicious activity or unauthorized entry.							

2.12.1 How are they monitored? (*Note: Question was only asked if the response to question 2.12 was rarely, sometimes, often, or always.*)

- ❑ In person
- ❑ By camera
- ❑ Other _____

	Never	Rarely	Sometimes	Often	Always	Not Sure	Not Applicable
2.13 Monitors the main service line (not including self-service areas) for signs of suspicious activity or unauthorized entry:							

2.13.1 How are they monitored? (*Note: Question was only asked if the response to question 2.13 was rarely, sometimes, often, or always.*)

- ❑ In person
- ❑ By camera
- ❑ Other _____

	Never	Rarely	Sometimes	Often	Always	Not Sure	Not Applicable
2.14 Monitors the self-service bar (fruit bars, salad bars) for signs of suspicious activity or unauthorized entry							

2.14.1 How are they monitored? (*Note: Question was only asked if the response to question 2.14 was rarely, sometimes, often, or always.*)

- ❑ In person
- ❑ By camera
- ❑ Other _____

	Never	Rarely	Sometimes	Often	Always	Not Sure	Not Applicable
2.15 Monitors the student dining area for signs of suspicious activity or unauthorized entry.							

2.15.1 How are they monitored? (*Note: Question was only asked if the response to question 2.15 was rarely, sometimes, often, or always.*)

- ❑ In person
- ❑ By camera
- ❑ Other _____

	Never	Rarely	Sometimes	Often	Always	Not Sure	Not Applicable
2.16 Has an emergency lighting system in the foodservice area.							
2.17 Prohibits foodservice areas from being used for 'special events' such as parent/teacher dinners or public events unless foodservice staff are present to monitor/supervise							

2.18 This is the end of the second section. The next category refers to food and supplies, we will be asking four questions. Do you have any questions about the previous sections?

3. FOOD AND SUPPLIES

	Never	Rarely	Sometimes	Often	Always	Not Sure	Not Applicable
3.1 Restricts access to **external** School Nutrition Program cold or frozen food storage areas to designated employees only.							

3.1.1 Can you tell me, yes or no, if the following individuals have access to **external** secured cold or frozen food storage areas.

- ❑ Principals
- ❑ Teachers
- ❑ Custodians
- ❑ Maintenance
- ❑ Volunteers
- ❑ Visitors
- ❑ Other school personnel, specify _____

	Never	Rarely	Sometimes	Often	Always	Not Sure	Not Applicable
3.2 Restricts access to **internal** School Nutrition Program cold or frozen areas to designated employees only							

3.2.1 Can you tell me, yes or no, if the following individuals have access to **the internal** cold or frozen areas.

- ❑ Principals
- ❑ Teachers
- ❑ Custodians
- ❑ Maintenance
- ❑ Volunteers
- ❑ Visitors
- ❑ Other school personnel, specify _____

	Never	Rarely	Sometimes	Often	Always	Not Sure	Not Applicable
3.3 Restricts access to the School Nutrition Program **dry storage areas** to designated employees only.							

3.3.1 Can you tell me if the following individuals have access to **dry storage areas**.

- ❑ Principals
- ❑ Teachers
- ❑ Custodians
- ❑ Maintenance
- ❑ Volunteers
- ❑ Visitors
- ❑ Other school personnel, specify _____

3.4 Is there anyone else that has access to the storage facilities? Vendors?

This is the end of section three. The next section will ask six questions about external vendors.

4. INCOMING (EXTERNAL VENDORS)

	Never	Rarely	Sometimes	Often	Always	Not Sure	Not Applicable
4.1 Purchases all food ingredients, food products, packaging materials, and other foodservice supplies only from approved vendors.							
4.2 Verifies external deliveries against purchase orders.							
4.3 Inspects food packages for evidence of tampering upon delivery.							
4.4 Rejects products that have been opened or otherwise compromised.							
4.5 Rejects unscheduled deliveries							

4.5.1 Why? (*Note: Question was only asked if the response to question 4.5 was never.*)

	Never	Rarely	Sometimes	Often	Always	Not sure	Not applicable
4.6 Addresses a recall situation within 12 hours.							

4.6.1 If any, what recall types have you had to respond to in the last 12 months? (*Note: Question was only asked if the response to question 4.6 was rarely, sometimes, often, or always.*)

4.7 What is your level of confidence (not confident, somewhat confident, confident, very confident, extremely confident) that you can address a recall due to intentional contamination?

- ❑ Not confident
- ❑ Somewhat confident
- ❑ Confident
- ❑ Very confident
- ❑ Extremely confident

This is the end of section four. The next six questions will refer to deliveries between schools, the warehouse, the production center.

5. INTERNAL SYSTEMS (INTER-SCHOOLS)

We will be using the original scale for the next several questions.

	Never	Rarely	Sometimes	Often	Always	Not Sure	Not Applicable
5.1 Verifies inter-school deliveries against order.							
5.2 Inspects food packages for evidence of tampering.							
5.3 Rejects unscheduled deliveries							

5.3.1 Why? 4.5.1 Why? (*Note: Question was only asked if the response to question 5.3 was never.*)

	Never	Rarely	Sometimes	Often	Always	Not Sure	Not Applicable
5.4 Secures school delivery trucks when not being loaded or unloaded.							
5.5 Tracks school delivery trucks in real time while en route.							

5.5.1 Can you provide examples of how the trucks are tracked? (*Note: Question was only asked if the response to question 5.5 was rarely, sometimes, often, or always.*)

	Never	Rarely	Sometimes	Often	Always	Not Sure	Not Applicable
5.6 Designates employees trained on food defense to deliver the food							

We are approximately half way through the interview. The next three questions are about the water and ice supply.

6. WATER AND ICE SUPPLY

	Never	Rarely	Sometimes	Often	Always	Not Sure	Not Applicable
6.1 Monitors water supply that is transported or provided for field trips							
6.2 Monitors water supply that is transported or provided in the cafeteria.							
6.3 Restricts access to ice machines							

This is the end of section six. The next two questions will refer to personnel training.

7. PERSONNEL TRAINING

	Never	Rarely	Sometimes	Often	Always	Not Sure	Not Applicable
7.1 Trains all foodservice employees on food defense.							

7.1.1 Why don't you provide training on food defense? (*Note: Question was only asked if the response to question 7.1 was never.*)

7.1.2 Can you tell me a little bit about the food defense training in your program? **(FOR INTERVIEWER ONLY: Redirect if they talk about food safety)** (*Note: Question was only asked if the response to question 7.1 was rarely, sometimes, often, or always.*)

7.1.3 Can you tell me about the training programs, resources used, and what is missing? (*Note: Question was only asked if the response to question 7.1 was rarely, sometimes, often, or always.*)

	Never	Rarely	Sometimes	Often	Always	Not Sure	Not Applicable
7.2 Provides information about the importance of food defense to non-foodservice staff.							

7.2.1 To whom do you provide information? (principals, teachers, custodians, volunteers, or school nurses) (*Note: Question was only asked if the response to question 7.2 was rarely, sometimes, often, or always.*)

7.2.2 What type of information do you provide? (*Note: Question was only asked if the response to question 7.2 was rarely, sometimes, often, or always.*)

7.2.3 How often do you provide information? (*Note: Question was only asked if the response to question 7.2 was rarely, sometimes, often, or always.*)

This is the end of section seven. The next section has nine questions related to the food defense plan. For this section we will be using the confidence scale.

8. FOOD DEFENSE PLAN

8.1 Does your **school district as a whole** have a food defense plan?

- ❑ Yes
- ❑ No
- ❑ Not Sure

8.1.1 Why not? What are some of the barriers for having one? (*Note: Question was only asked if the response to question 8.1 was no.*)

8.1.2 What is your level of confidence (not confident, somewhat confident, confident, very confident, extremely confident) that you school district food defense plan would **prevent** an intentional contamination incident? (*Note: Question was only asked if the response to question 8.1 was yes.*)

- ❑ Not confident
- ❑ Somewhat confident
- ❑ Confident
- ❑ Very confident
- ❑ Extremely confident

8.1.3 Is the food defense plan continuously updated? (*Note: Question was only asked if the response to question 8.1 was yes.*)

- ❑ Yes
- ❑ No

8.1.4 How often is the food defense plan updated? (*Note: Question was only asked if the response to question 8.1 was yes.*)

8.1.5 Who is responsible for implementing the food defense plan? (*Note: Question was only asked if the response to question 8.1 was yes.*)

8.1.6 Who is responsible for monitoring the food defense plan? (*Note: Question was only asked if the response to question 8.1 was yes.*)

8.1.7 What is the title of the employee(s) assigned to implement the food defense plan? (*Note: Question was only asked if the response to question 8.1 was yes.*)

8.1.8 What are the specific responsibilities related to food defense of the employee(s) responsible for implementing the food defense plan? (*Note: Question was only asked if the response to question 8.1 was yes.*)

8.1.9 How long has that person held the position? (*Note: Question was only asked if the response to question 8.1 was yes.*)

8.1.10 What is the title of the employee(s) assigned to monitor the food defense plan? (*Note: Question was only asked if the response to question 8.1 was yes.*)

8.1.11 What are the specific responsibilities related to food defense of the employee(s) responsible for monitoring the food defense plan? (*Note: Question was only asked if the response to question 8.1 was yes.*)

8.1.12 How long has that person held the position? (*Note: Question was only asked if the response to question 8.1 was yes.*)

8.2 What is your level of confidence (not confident, somewhat confident, confident, very confident, extremely confident) that your **school district as a whole** can effectively **respond** to an intentional contamination incident?

- ❑ Not confident
- ❑ Somewhat confident
- ❑ Confident
- ❑ Very confident
- ❑ Extremely confident

8.3 Does the **school district** have a food defense team?

- ❑ Yes
- ❑ No
- ❑ Not Sure

8.3.1 Who is included on the team? **(Mark those that they mention and then ask those that they did not mention)**? (*Note: Question was only asked if the response to question 8.3 was yes.*)

- ❑ Administration
- ❑ Local Public Health Officials
- ❑ Nurses
- ❑ Police
- ❑ School Police
- ❑ Teachers
- ❑ Fire Department
- ❑ Maintenance
- ❑ Parents
- ❑ School Nutrition Director
- ❑ Students
- ❑ Other _____

8.4 Does your **school nutrition program** have a food defense plan?

- ❑ Yes
- ❑ No
- ❑ Not Sure

8.4.1 What is your level of confidence (not confident, somewhat confident, confident, very confident, extremely confident) that your school nutrition program food defense plan would **prevent** an intentional contamination incident? (*Note: Question was only asked if the response to question 8.3 was yes.*)

- ❑ Not confident
- ❑ Somewhat confident
- ❑ Confident
- ❑ Very confident
- ❑ Extremely confident

8.4.2 What are the barriers for having one? Does your School Nutrition Program have plans to develop/implement one? (*Note: Question was only asked if the response to question 8.3 was no.*)

8.5 What is your level of confidence (not confident, somewhat confident, confident, very confident, extremely confident) that your **school nutrition program** can effectively **respond** to an intentional contamination incident?

- ❑ Not confident
- ❑ Somewhat confident
- ❑ Confident
- ❑ Very confident
- ❑ Extremely confident

8.6 Walk us through the steps if someone in your school district observes an act of intentional food contamination or tampering? It is fine if you say that you don't know.

8.7 What is the most important thing you could do in your district to prevent intentional contamination?

8.8 What are some challenges in implementing food defense practices?

8.9 What are some challenges associated with food defense in your school nutrition program?

The next section is the second to last section of the questionnaire, and has six questions about suppliers.

9. SUPPLIERS

9.1 Approximately, how many suppliers do you have?

9.2 Who would you consider your major suppliers?

9.3 How would you classify your major suppliers? National (SYSCO, US Foods), regional, or local

- ❑ National (SYSCO, US Foods)
- ❑ Regional
- ❑ Local
- ❑ Others _____

9.4 Do you use a prime vendor? **(Prime vendor: Vendor from which they get most of their product).**

- ❑ Yes
- ❑ No

9.5 Do you know if any of your suppliers have a food defense plan?

- ❑ All of them
- ❑ Most of them
- ❑ Some of them
- ❑ None
- ❑ Do not know

9.6 Finally, when thinking about your suppliers do you have any concerns about food defense?

Our final section has 10 questions about general information of the school nutrition program.

10. SCHOOL NUTRITION PROGRAM GENERAL INFORMATION

10.1 How many students are enrolled in your school district?

- ❑ Less than 2,500 (Small)
- ❑ 2,500 - 19,999 (Medium)
- ❑ 20,000 - 39,999 (Large)
- ❑ 40,000 or more (Mega)

10.2 On average, how many lunches are served in the district daily?

10.3 Is your school nutrition program self-operated or operated by a contractor?

- ❑ Self-operated
- ❑ Contractor _____

10.4 How many employees do you have in the district's school nutrition program?

10.5 Has your school nutrition program conducted a food defense audit?

- ❑ No
- ❑ Yes, internal auditing
- ❑ Yes, external by government agency
- ❑ Yes, external by consulting company

10.5.1 When was the last audit? (*Note: Question was only asked if the response to question 10.5 was yes, internal auditing; yes, external by government agency; or yes, external by government agency.)*

10.6 Does the school nutrition program have a crisis management plan?

- ❑ No
- ❑ Yes, but no written documents
- ❑ Yes and it is well documented

10.7 What is the title of your position?

10.8 How long have you worked in **any type** of foodservice?

- ❑ Less than 1 year
- ❑ 1-3 years
- ❑ 4-7 year
- ❑ 8-12 years
- ❑ 13-20 years
- ❑ Over 20 years

10.9 How long have you worked in **your current** position?

- ❑ Less than 1 year
- ❑ 1-3 years
- ❑ 4-7 year
- ❑ 8-12 years
- ❑ 13-20 years
- ❑ Over 20 years

10.10 Have you ever received training about food defense?

- ❑ Yes
- ❑ No

10.10.1 Which topics have been included in the training you have received?

10.11This is the end of the interview, would you like to add anything else?

Thank you for participating in this research project.

End time

_____

Appendix B:

Invitation Email and Invitation Letter

Initial Contact by Email

Dear Mr/Mrs/Dr. _____(Name)

Good morning, my name is _____. I work for the Center for Food Safety in Child Nutrition Programs, a center funded by the USDA Food and Nutrition Service Office of Food Safety and located at Kansas State University.

The Center is conducting a research project to identify current food defense practices in school nutrition programs. We are currently recruiting School Nutrition Directors or the person responsible for the School Nutrition Program to participate in a one-hour interview. The interview will be conducted by video conferencing or telephone.

The attachment contains additional information about the study. Please reply to this email and let us know if you will like to participate. We would like to schedule the interview as soon as possible or within the next week or two. If you have questions, contact me at 785-532-5549 or Kerri Cole at 785-532-2211, who is also with the Center.

Thank you,

(Interviewer Name and Signature Line)

Invitation Letter

THE CENTER FOR FOOD SAFETY IN CHILD NUTRITION PROGRAMS
152 Justin Hall
1324 Lover's Lane
Manhattan, KS 66506
785.532.2211
www.cnsafefood.ksu.edu

<<First Name>> <<Last Name>>
<<School District Name>>
<<Address>>
<<City>>, <<State>> <<Zip code>>

Dear <<Title>> <<Last Name>>,

Food defense is an important part of comprehensive food protection for child nutrition operations. Although a formal food defense plan is not required, the United States Department to Agriculture Food and Nutrition Service recommends that child nutrition programs develop a food defense plan. Therefore, the Center for Food Safety in Child Nutrition Programs at Kansas State University is seeking your participation in a research project to identify current food defense practices utilized in school nutrition programs. This information will serve as the foundation to provide evidence-based recommendations for the development of education and training resources.

Your school district was randomly selected as part of a limited number of districts, nationally. Your involvement in the study would include participating in a one-hour interview either through a video conferencing platform or by telephone.

Participation of school nutrition directors is very important to the success of the study. Information provided by the director is confidential.

We hope you will assist us in increasing food defense and making our schools safer by taking part in this important project. Should you have any questions, please contact Paola Paez at (785) 532-5549 or by email, paolap@ksu.edu.

Cordially,

Paola Paez, PhD
Research Associate Professor

Kevin R. Roberts, PhD
Associate Professor and Co-Director

Kevin Sauer, PhD, RDN, LD
Associate Professor and Co-Director

Carol Shanklin, PhD, RDN
Professor and Dean of Graduate School

KANSAS STATE UNIVERSITY

USDA

Appendix C:

Calendar Invitation, Additional Information, and Scales

Calendar Invitation

ZOOM

Good afternoon,

Thank you so much for agreeing to participate in our research project. The interview has been scheduled for _____(Date/Time).

Below is the information you will need to connect through our video conference system, we use Zoom. If you have any trouble or need more information please feel free to contact me. Even though the interview will take approximately one hour, you will see that the invitation is for two hours, we just want to make sure we have plenty of time in case we need it.

I have also attached some additional information about the project, please read it before our interview on _____ (Day).

I will send a reminder that morning.

Join from PC, Mac, Linux, iOS or Android: _____(link)

Let me know if you have questions,

(Interviewer Name and Signature Line)

PHONE

Good afternoon,

Thank you so much for agreeing to participate in our research project. The interview has been scheduled for _____ (Date/Time). I will call your office that day at _____ (phone number).

I have also attached some additional information about the project, please read it before our interview on _____ (Day).

We will send a reminder on _____ (Day).

Let me know if you have any questions.

Thank you,

(Interviewer Name and Signature Line)

Additional Information

Food Defense: An assessment of practices in school nutrition programs

The purpose of this research study is to investigate practices to prevent deliberate or intentional acts of contamination or tampering in school nutrition programs. Specifically, during this interview, current food defense practices will be identified.

- The interview should last approximately one hour and will be audio- or video-recorded.
- There are no foreseeable risks for your participation and no compensation for your time.
- Your responses and identity will remain confidential and referred to only by code.
- Your participation is voluntary and you may refuse to answer any question or end the interview at any time without penalty.
- Your participation benefits the research community and provides valuable information for improving food defense practices in school nutrition programs.

Should you have any questions regarding the research process or your rights in this study, you may contact Rick Scheidt, Chair, Committee on Research Involving Human Subjects at 785-532-3224, 203 Fairchild Hall, Kansas State University, Manhattan, KS 66506. Any other questions can be referred to Dr. Kevin Roberts, Associate Professor and Co-Director of the Center at 785-532-2299, 152 Justin Hall, Kansas State University, Manhattan, KS 66506.

Scales

Food Defense in Schools

Food Defense refers to the protection of the food supply from deliberate or intentional acts of contamination or tampering.

Scale on **how often** your school district/school nutrition program does…

- Never
- Rarely
- Sometimes
- Often
- Always
- Not sure
- Not applicable

Food Defense in Schools

Food Defense refers to the protection of the food supply from deliberate or intentional acts of contamination or tampering.

Scale on **level of confidence**:

- Not confident
- Somewhat confident
- Confident
- Very confident
- Extremely Confident

Appendix D:

Interview Reminder

Good morning/afternoon _____ (Name),

This is a reminder of our interview scheduled for _____ (Date/Time). I will call your office tomorrow at _____(Phone Number).

I have also attached some additional information that we will be using during our interview

Let me know if you have any questions.

Thank you,

(Name and Signature Line)

Appendix E:

Thank You Note and a Copy of Creating Your School Food Defense Plan

Thank You Note

THE CENTER FOR FOOD SAFETY IN CHILD NUTRITION PROGRAMS

THANK YOU!

We would like to once again thank you for participating in our Food Defense in Schools Research Study.

We have attached a document that you may find helpful in creating, implementing, or updating your food defense plan.

<><><><><><><><><><><>

Kerri B. Cole, Project Coordinator
The Center for Food Safety in Child Nutrition Programs
Kansas State University
148B Justin Hall
Manhattan, KS 66506
785-532-2211
www.cnsafefood.k-state.edu
www.facebook.com/cnsafefood

CREATING YOUR SCHOOL FOOD DEFENSE PLAN

USDA/Food and Nutrition Service
July 2012

Why Build a School Food Defense Plan?

Food defense is having measures in place to reduce the chances of someone intentionally contaminating the food used in your foodservice operation in order to harm children and cause panic, alarm, and distrust in our food supply. A food defense plan helps you identify steps you can take to minimize the risk of intentional contamination or tampering of food products in your school. A plan increases preparedness and will be particularly helpful during emergencies when stress is high and quick responses are essential.

Although food defense is different from food safety, they are similar in that both focus on preventing the contamination of food. Food safety deals with preventing the unintentional contamination of food products that can be reasonably anticipated based on the type of food product and how it is prepared. This knowledge is used to construct your School Food Safety Plan based on Hazard Analysis and Critical Control Points (HACCP) Principles. Creating a food defense plan does not require development of another HACCP-type document. Some of the information you may use will possibly exist in your School Food Safety Plan, Sanitation Standard Operating Procedures, and other documents such as emergency response procedures. Make sure to consult these documents for information.

Your School Food Defense Plan Components

Your finished plan will contain the following components:

1. Assessment of current food defense measures
2. Identification and mitigation of risks
3. Emergency Contact List
4. Implementation and Maintenance of Plan

USDA/Food and Nutrition Service
July 2012

Four Easy Steps to Creating Your School Food Defense Plan

Step 1 – Assess School Food Defense Measures

Step 2 –Assemble the Pieces

Step 3 – Complete Your Plan

Step 4 – Use and Maintain Your Plan

By completing these four steps, using the tools provided, you will have a food defense plan for your school. Keep in mind there is no "one size fits all" approach to creating a food defense plan and not all of the guidance contained in this document may be appropriate or practical for every school. Your plan can be as long or as short as is appropriate and you can modify and customize the strategies in the templates to fit your school.

Step 1 – Assess School Food Defense Measures

In order to build a useful school food defense plan, you should assess current practices that you are already taking to reduce or prevent the risk for the intentional contamination of food within your school and school foodservice operation. Ultimately, like your School Food Safety Plan, each school should have a food defense plan written and adapted for the needs of that specific school. Think about how many schools are in your district. You may be able to group them into schools with similar characteristics, such as full preparation kitchens or satellite kitchens that do no onsite preparation.

Because some important aspects of food defense may be centrally managed, you may need to start with a central plan or a district plan. For instance, if you have central receiving at central kitchen and warehouse facilities, your school district plan will need to start there. Central kitchen operations have aspects that could make them particular targets, for example bulk mixing and processing provide a vulnerable spot to contaminate foods that would then be distributed to a large number of schools. You will want to be sensitive to identifying measures to reduce the vulnerabilities for central kitchens. Your district may also have consistent security policies and procedures, and possibly similar types of equipment (cameras, locks, etc.) throughout the district. You will want to develop components of your food defense plan addressing these topics in a consistent manner for the district.

It may be more efficient to develop a plan starting at the district level, and then work with staff at each school to customize each school building's individual plan.

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Food Defense Plan

for

(Your district or school name) _____

Step 1 – Assess School Food Defense Measures

The first step is an assessment of your current actions to prevent the intentional contamination of your food or foodservice operation. Read through the following checklists and answer each question (for either the district level or the school level) by putting a check mark in the 'Yes', 'No', or 'N/A' (not applicable) columns. You may need to consult with other staff or groups to help answer some of the questions. You will want to keep the results of this assessment confidential so that it does not provide a roadmap for those that might do harm.

Outside Security

1. What food defense measures does your school have in place for the exterior of the building?

	Yes	No	N/A
The school grounds and/or buildings are secured (*e.g.,* by locks, seals, or sensors) **during the school day** to prevent entry by unauthorized persons through: • Outside doors and gates			
• Windows			
• Roof openings			
• Vent openings			
The school grounds and/or buildings are secured (*e.g.,* by locks, seals, or sensors) **after hours and on weekends** to prevent entry by unauthorized persons through: • Outside doors and gates			
• Windows			
• Roof openings			
• Vent openings			
Access to external refrigeration and/or storage facilities for school nutrition programs is restricted to designated employees only?			
Access to the following systems or controls for the following systems is restricted, controlled, or monitored (*e.g.*, by locked door/gate or limiting access to designated employees, seals, equipped with a sensor device) to prevent access by unauthorized persons: • Heating, ventilation and A/C systems			
• Propane Gas/ Natural Gas			
• Water systems			
• Electricity			
• Chemical/disinfection supplies and systems			
The school has procedures for all visitors.			

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Inside Security

2. What food defense measures does your school or school foodservice operation have in place inside the building?

	Yes	No	N/A
There is an emergency lighting system in the school.			
The school has monitored security cameras.			
The school has an emergency alert system that is tested regularly.			
The locations of controls for emergency alert systems are clearly marked.			
All restricted areas (*i.e.,* areas where only authorized employees have access) are clearly marked.			
Visitors are restricted to specific areas or accompanied by school personnel.			
Maintain inventory of keys to secured/sensitive areas of the school.			
Emergency exits are alarmed and self-locking doors are only able to be opened from the inside per local and state fire and building codes.			
The agency or authority that would serve as a first responder(s) based on specific emergency situations has been determined.			
There are procedures for communicating with students, parents, and with the media when necessary (for example, notices of incidents or a press release).			
There is a list of emergency contact information for local, state, and federal government homeland security authorities and public health officials.			
Someone in the school has called each emergency contact to verify they are the correct point of contact.			
The contact information is reviewed and updated regularly.			
There are procedures for notifying appropriate law enforcement and public health officials when our school receives a threat about food contamination, as well as when a member of the school community observes or suspects food tampering.			

Foodservice Operation Security

3. Which of the following food defense procedures does your school foodservice operation have in place?

	Yes	No	N/A
Foodservice Areas			
Access to foodservice production areas is restricted to foodservice or other authorized employees.			
At least one authorized employee is required to be present in the foodservice area at all times when the area is not locked, for example			

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during meal service set-up.			
Foodservice equipment (such as steam-jacketed kettles, steamers, choppers, hot/cold storage systems, or mixers) is monitored when in use to prevent someone from intentionally contaminating food during preparation.			
There are procedures to monitor all foodservice areas for signs of suspicious activity or unauthorized entry. This includes self-service areas such as buffets and salad bars, receiving, outside storage, and solid waste disposal.			
Our policy/policies prohibit foodservice areas to be used for 'special events' such as parent/teacher dinners or public events unless foodservice staff is present to monitor/supervise.			
There is a policy or policies that prohibit(s) outside foods and medications in foodservice areas (for example, personal foods or food brought in for storage or reheating by students or employees). An alternate storage place for such items is provided outside of foodservice areas.			
Foods and Supplies			
All food ingredients, food products, packaging materials, and other foodservice supplies are purchased only from reputable vendors.			
Vendors are required to have food defense plans or food defense measures in place as part of our bid specifications.			
All food suppliers, including central kitchens, are required to use tamper-proof packaging on foods they ship to our school(s).			
There are procedures that require employees to inspect food packages for evidence of tampering prior to use.			
Food Storage			
Access to food storage areas, including cold and dry storage areas, is limited (*e.g.*, by locked door/gate or other) to essential employees.			
There are procedures that require all leftover food items be stored in tightly sealed (except during cooling), clearly labeled, and dated containers.			
There are policies and/or procedures that require food or ingredients that are not properly sealed and labeled be discarded.			
Security inspections of storage facilities are conducted regularly. Records of the security inspections results are maintained.			
The inventory of products is regularly checked for unexplained additions and withdrawals from existing stock.			
Hazardous Materials/Chemicals			
Hazardous materials/chemicals such as pesticides, cleaning materials, sanitizers, and disinfectants are received and stored securely outside of food preparation areas.			
The access to inside storage areas for hazardous materials/chemicals is restricted in some manner to allow use by designated employees only.			
A monthly inventory of hazardous materials/chemicals is maintained.			
Discrepancies in daily inventory of hazardous materials/chemicals are immediately investigated.			
Emergency Situations			

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Specific guidelines or procedures exist for reporting suspected products or incidents.			
Detailed procedures exist for responding to actual incidents of product tampering or contamination.			
Procedures exist for recalling products and for quickly identifying and isolating recalled products.			
Procedures exist for safely handling and disposing of contaminated products. These procedures identify how and where to isolate suspected contaminated food or foodservice products.			
Procedures exist for providing safe and secure substitute meals, including procedures for feeding students at an alternate site(s).			
There is a list readily available of phone numbers of suppliers and alternate suppliers (for situations when regular suppliers are unable to provide product).			
An emergency supply of disposables for foodservice is available in case utensils, trays, etc. are contaminated, or in case items cannot be decontaminated.			
Policies and procedures exist for actions to take if water supply contamination is suspected. Alternate sources(s) of potable water, for example bottled water, have been identified.			
Arrangements have been made with local health officials to ensure immediate notification of the school if the potability of the public water supply is compromised.			

Shipping and Receiving Security

4. Which of the following food defense procedures does your school foodservice operation have in place for handling shipments/receiving?

	Yes	No	N/A
Shipping (outgoing) - central kitchens			
Food defense procedures for handling outgoing shipments are in place.			
If applicable to operation, outgoing shipments are sealed with tamper-evident seals.			
The seal numbers on outgoing shipments are documented on the shipping documents.			
Receiving (incoming) - central kitchens and school buildings			
Access to loading docks is controlled to avoid unverified or unauthorized deliveries.			
Unsupervised access, either during work hours or off hours, by giving keys, codes, etc to suppliers/vendors, is not allowed.			
Advance notification from suppliers (by phone, e-mail, or fax) is required for all incoming deliveries.			
The loading and unloading of vehicles transporting food products or other materials used in the foodservice operation is closely monitored.			
Suspicious alterations in the shipping documents are immediately investigated.			

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	Yes	No	N/A
All deliveries are checked against the roster of scheduled deliveries.			
Procedures are in place to handle unscheduled deliveries.			
Off-hour deliveries are not accepted.			
Prior notice of the delivery is required if off-hour deliveries are accepted.			
The presence of an authorized individual is required to verify and receive the delivery, if off-hour deliveries are accepted.			
Incoming shipments are required to be sealed with tamper-evident or numbered seals (and documented in the shipping documents). These seals are verified against the documentation prior to opening.			
Partial load shipments are sealed.			
Incoming shipments are checked at the receiving dock for evidence of tampering.			
All employees are provided training on identifying packaging that is acceptable and not acceptable.			
Policies and procedures are in place to reject food and chemical packages that are not acceptable, cannot be verified against delivery invoice, or contain unacceptable changes to shipping documents.			
Suppliers are required to have food defense measures to cover their facilities and transport of food.			

Handling Mail and Money

5. Which of the following food defense procedures does the school foodservice operation have in place to handle mail and money?

	Yes	No	N/A
Mail handling is done in a room away from the foodservice operation.			
A policy exists to direct all incoming mail (from the U.S. Postal Service or from private mail services such as UPS, FedEx, etc.) to one central location.			
Mail-handlers are trained to recognize and handle suspicious pieces of mail using U.S. Postal Service guidelines. (Helpful information is provided at the following website: http://www.usps.com/news/2001/press/serviceupdates.htm)			
Procedures are in place to check toilets, maintenance closets, personal lockers, and storage areas for suspicious packages.			
Employees are aware that the handling of money is a potential means of spreading dangerous contaminants. Money transactions are separate from the food preparation areas.			
A policy exists that requires cashiers to always wash hands after handling money and prior to preparing, serving, or handling food or foodservice equipment.			

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Personnel Security and Training

6. Which of the following food defense procedures does your foodservice operation have in place for ensuring that personnel adhere to and are trained in the security requirements?

	Yes	No	N/A
Security			
Background checks are conducted on all employees and vendors who will be working in foodservice areas.			
An updated employee roster is kept by management, i.e., who is absent, who the replacements are, and when new employees are being integrated into the workforce.			
Employees, visitors, and vendors are identified in some manner at all times while on the school premises.			
Procedures exist for dealing with an unauthorized person(s) in restricted areas, including restricted foodservice areas.			
Our school foodservice operation controls access by employees and vendors entering foodservice operation areas during working hours (*e.g.* coded doors, receptionist on duty, swipe card, etc.).			
Our school foodservice operation controls entry of employees into the school foodservice operation area during non-working hours (*e.g.* access limited by key card or code number).			
Our school foodservice operation controls entry of suppliers/vendors into the school foodservice operation area during non-working hours (*e.g.* access limited by key card or code number).			
A policy exists excluding personal items within food production or foodservice areas.			
Employee lockers are inspected on a regular basis.			
A procedure exists to account for all keys provided to current employees. Keys are marked 'Do Not Duplicate'.			
A procedure exists to account for all keys, uniform(s), and identification badges provided to former employees.			
Procedures exist to document reported foodborne illnesses and to track unusual absenteeism trends and unusual staff health conditions.			
A policy and/or procedure exists directing a roster be kept of employees' emergency contacts and necessary medical information should family be unavailable.			
Training			
Employees receive basic food safety training.			
There a schedule to conduct refresher training regularly.			
All foodservice employees receive training on food defense procedures as part of their orientation training.			
All foodservice employees receive training on food defense procedures as part of regular in-service update training.			
Employees are trained to use chemicals properly to prevent accidental food contamination and human exposure.			
Employees are encouraged to report signs of possible product contamination, unknown or suspicious persons in the facility, or breaks in the food defense system.			

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	Yes	No	N/A
Employees are trained on how they should prepare and submit incident reports.			
Vendors and other non-foodservice staff, such as principals, teachers, or school nurses, are given a briefing on the potential for intentional contamination of food and the importance of food defense.			

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Step 2 – Assemble the Pieces

You can now build the second piece of your plan based on the checklist.

- The items to which you answered 'Yes' are the first piece of your plan and describe the actions you are currently taking to protect the food in your operation from intentional contamination.

- The second piece of your plan is to identify risks you need to address but have not yet addressed. Select at least one to three of the items in each category on the checklist to which you answered 'No' and that you think put you at greatest risk. Move those items to column 2 of the template below.

- You should determine actions or measures you could take to deal with each of the items to which you answered 'No'. Put these actions in column 3. (See examples of some possible actions in Appendix A).

Area	Column 2 Identified Risk	Column 3 Action to Counter Risk
Outside Security		
Inside Security		
Foodservice Operation Security		
Shipping/Receiving Security		
Handling Mail and Money		
Personnel Security and Training		

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Step 3 – Complete Your Plan

Completing New Actions Identified in Your Plan

In order to complete the actions identified in Step 2, designate the action and person or team responsible for developing the measures, policies or procedures. Have the person or team submit a timeline for completing the tasks. You can use a table like the one below to organize the information and include it in your plan.

Actions/Policies/Procedures	Person/team responsible for development	Proposed Completion Date

Assigning Responsibilities

Individual employee's food defense responsibilities should be defined and documented in your plan. All employees should be familiar with the food defense plan and measures. Assign overall responsibility for food defense to a single employee, if possible, who has an understanding of the security requirements. Ensure that a back-up is assigned for that employee.

Creating an Emergency Contact List

A key piece of your plan is a current list of names and phone numbers to contact during an emergency. In addition to school and school foodservice employees, current local, state, and federal government Homeland Security contacts and public health officials should be listed in the plan. Local law enforcement and FBI offices should also be included in the contact list. Update the list regularly. You may wish to keep a copy of this list near your phone(s) for ready reference.

Person, Agency or Organization	Phone Number
School Foodservice Food Defense Contact	
School Emergency Contact	
Local Police Department	
Local FBI Office Weapons of Mass Destruction Coordinator	
City/County Department of Health	
State Department of Health	
State Department of Emergency Response or Homeland Security	
USDA FNS Regional Office	
USDA FSIS District Office	
FDA Regional Office	
Vendors	
Other	

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Step 4 – Use and Maintain Your Plan

The final piece of your plan covers the implementation and verification. You should create a schedule and/or timetable for training on the plan and for testing, reviewing, and revising the plan on a regular basis. These schedules/timetables should be included as a piece of your plan.

Training Staff

Train staff on all provisions of the plan. The purpose of food defense awareness training is to ensure that your employees know their responsibilities. Training should address topics like access control procedures, access to restricted areas, protecting critical components, and procedures for reporting suspicious activities. Understanding the threat of intentional contamination and the potential consequences should help employees consistently execute preventive measures, increasing the overall effectiveness of the plan. Encourage the "neighborhood watch" concept for the operation, "If you see something, say something".

Testing the Plan

Conduct drills at least quarterly to test and verify the effectiveness of the plan. Consider doing some daily or weekly checks, such as checking the status of entry ways that are to be locked; checking for any abuse of employee conduct by bringing personal items into operational areas; checking to see if hazardous material inventory records are being maintained; etc. You should document findings, for example in a table like the sample below, and then list corrective actions to prevent them from occurring again.

Date	Area Tested	Results	Signature	Corrective Action Taken	Date Action Taken	Signature

Reviewing and Revising the Plan

Review your plan and revise it, as needed, at least annually or when there is a change in your operations. You may need to revise the plan to address changing conditions such as new equipment, changing vendors, adding a new food preparation process, contracting new services; adding a new technology; etc. You should document your review and revision, for example by using a table like the one below.

Date	Reason for Assessment	Signature

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Include Food Defense in Food Recall Procedures

You may already have Food Recall Procedures developed and included in some other plan in your operation. Review your recall procedures and determine if any updates, such as contacting local law enforcement, need to be made to address food defense concerns. If you do not have established recall procedures in place, resources are available from the National Food Service Management Institute (NFSMI) at www.NFSMI.org.

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Appendix A

Potential Food Defense Actions

Following are some examples of actions, strategies, or measures that could be used to counter risks identified in your checklist. The samples are not exhaustive; you will need to think about your specific operation and how the samples or similar actions could be modified to be practical, useful, and effective for your operation.

Outside Security
Create a diagram or map identifying foodservice related areas that are inside the building. Restrict access to this area to foodservice or other authorized personnel only. Inform the school administration of this policy. Post the diagram in appropriate locations in the school.
Create a diagram or map identifying foodservice related areas that are outside of the building. These areas include loading docks, parking lots, trash areas, outside food or chemical storage, or outside water supply. Monitor these areas regularly. Post the diagram in appropriate locations in the school.
Control access of all visitors and non-school employees (including vendors, truck drivers, pest control operators, and environmental health specialists/sanitarians). Require them to sign in at the main office, show picture identification, and explain the purpose of their visit.
Provide visitors with a visitor's badge. An authorized school representative should accompany them to the appropriate foodservice site. Visitors should not be left unsupervised in the school.
Do not leave back doors to the foodservice areas unlocked, even when foodservice staff is present. Doors should only be unlocked for immediate use when entering or exiting.
Invest in a system to restrict or monitor access for foodservice area doors to the outside. Examples include specialized locks, locks with keypads or card readers, or closed circuit television monitoring equipment.

Inside Security
Designate primary food defense contacts, either an individual staff person or a team. List the contact information for school food defense and their responsibilities. Verify the information regularly and update when needed. (See Step 3 for a sample contact list form.) Distribute the emergency contact list to appropriate school and school foodservice staff.
Establish a relationship with local authorities. In the case of bioterrorism, you might need to contact law enforcement officials, hazardous material (HAZMAT) representatives, environmental health specialists/sanitarians, health department officials, fire and rescue department representatives, or Federal regulatory agency representatives [for food safety (FDA or FSIS); for public health (FDA or CDC); or for homeland security (DHS)]. (Homeland security information can be found at : www.whitehouse.gov/homeland/contactmap.html)
Compile an emergency contact list of authorities. Work with local law enforcement or district or county emergency management staff to create a comprehensive list. Verify and update emergency contact information regularly. This list should include the names and phone numbers for specific personnel from each agency or authority and their area of responsibility. (See Step 3 for a sample emergency contact form.
Create a diagram or map that defines the boundaries of all foodservice areas as well as locations of specific activities within the foodservice area. This should include self-service bars and school stores if applicable. Identify if access to the areas is limited or restricted to specific individuals.

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Determine which foodservice areas should by restricted. Particular attention should be paid to critical production areas where products are uniformly mixed or produced in large batches. Restricted areas should also include food storage areas and chemical storage rooms. Define who is allowed within restricted areas and when.
Mark the restricted foodservice areas and develop procedures for controlling entry by non-foodservice employees. This policy should address the access of all non-foodservice staff such as school administrators, principals, teachers, parents, cleaning staff, vendors, repairmen, etc.
Keep storage areas locked and limit access based on job function. Monitor access to storage areas by issuing keys to only those who should have access. Areas should not be unlocked and unmonitored. Require staff to lock up after each use. For example, if custodians clean the foodservice or food storage areas, ask them not to unlock the areas and leave them unlocked while cleaning other areas located at a distance.
Use logs or another format to document inventory control. Take a physical inventory monthly and examine integrity of packaging.

Foodservice Operation Security
Train employees to look for signs of wear, tear, and tampering before operating equipment.
Purchase all food ingredients, food products, packaging materials, and other foodservice supplies only from reputable suppliers who have appropriate permits or licenses. Priority consideration should be given to suppliers who furnish foods manufactured using food defense plans and measures. Obtain a signed agreement that suppliers will comply with applicable policies and procedures of the school's food defense management plan. Some questions you might ask to determine if a supplier is reputable: • Are you currently licensed and inspected by state and/or federal health authorities? (Request a copy of the Certificate of Inspection and license or permit as applicable). • Do you have references? (Request contact information for references). • Do you have a School Food Safety Plan in place? • Do you have a Food Defense Plan? • Do you have a Crisis Management Plan in place? • Do you have a recall plan in place? • Can you provide letters of guarantee?
Discuss food defense with your vendors to increase their understanding of the issues. Ask vendors if they have food defense policies and procedures in place.
Consider use of foods processed using alternative technologies (e.g., irradiated meat, ultra-pasteurized milk) because they may be less vulnerable to adulteration by certain contaminants
Develop procedures, including record keeping, for tracking all food and ingredients from manufacturer to table.
Document where ingredients and foods are stored and prepared in the foodservice operations. If an ingredient or food is determined to be contaminated, you need to be able to trace where that item is, where that item was, and where it came from. Trace foods by keeping thorough production and inventory records that include the lot and/or code numbers from ingredient packaging that are used and where the finished product was stored or served.
Protect the foodservice area by securing potential sources of contamination located in other parts of the school building, such as cleaning supplies storage and chemistry or biology labs.
Store hazardous materials in a separate locked area away from other inventory. Allow access to only those who need access.
Obtain Material Safety Data Sheets (MSDS) for hazardous chemicals from your supplier and make them readily available to foodservice staff. Follow manufacturer's instructions for use of hazardous chemicals.

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Restrict access to critical central kitchen operations, such as bulk mixing or processing, to employees that receive additional training and/or background investigations. Arrange staff schedules so that a single individual is not left alone during bulk mixing or processing operations.
Monitor student activity in the cafeteria, especially at self-service areas.

Shipping and Receiving Security
Purchase materials only from recognized vendors. Accept receipt only for scheduled deliveries. Check packages against invoice and order forms and examine package integrity. Request that vendors ship materials in tamper-evident packaging.
All truck shipments should be secured by use of tamper-evident seals. Drivers should be trained regarding proper shipping documentation. Staff should be trained to assess the seals and ensure that they are in place.
Have drivers sign in and escort them at all times while inside the foodservice operation.

Personnel Security and Training
Create policy and procedures on how and when to conduct drills. It is important to periodically conduct drills to practice the communication process and to simulate a foodservice crisis so that you can evaluate how the crisis response part of your plan is working.
Have employees sign a statement documenting what training was taken and when. Provide refresher training on a regularly scheduled basis.
Schedule training using the Food and Drug Administration retail foodservice food defense materials: 'ALERT: The Basics' and 'Employees FIRST', to reinforce food defense behaviors. (See web link in Appendix C)
Consider the use of uniforms, hats, jackets, etc. to make foodservice employees distinctive.

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Appendix B

List of Resources

Here is a list of sources of helpful information to consult when developing your school's food defense plan.

Conference for Food Protection – Emergency Guidance for Retail Food Establishments
http://www.foodprotect.org/guides/

Food and Drug Administration (FDA) - ALERT: Basic Awareness of Food Defense Issues and Preparedness
http://www.fda.gov/Food/FoodDefense/Training/ALERT/default.htm

FDA – "Employees FIRST: Food Defense Awareness for Front-line Food Industry Workers"
http://www.fda.gov/Food/FoodDefense/Training/ucm135038.htm

FDA – Retail Food Stores and Food Service Establishments: Food Security Preventive Measures Guidance
http://www.fda.gov/food/fooddefense/foodsecurity/default.htm

National Food Service Management Institute (NFSMI) - web-based customizable version of **A Biosecurity Checklist for School Foodservice Programs: Developing a Biosecurity Management Plan**
http://foodbiosecurity.nfsmi.org/

USDA, Food and Nutrition Service (FNS) - A Biosecurity Checklist for School Foodservice Programs: Developing a Biosecurity Management Plan
http://healthymeals.nal.usda.gov/hsmrs/biosecurity.pdf

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Appendix F:

Follow-up Phone Script and Email Template

Follow-up Phone Script

Subject: Food Defense in Schools

Good Morning/Afternoon, my name is _____. I work for the Center for Food Safety in Child Nutrition Programs at Kansas State University, a center funded by the USDA Food and Nutrition Service Office of Food Safety.

I'm calling as a reminder to an email we sent several days ago inviting you to participate in a research study about food defense in schools. Your participation would include a single one-hour interview.

Would you be interested in participating? Are there any questions you might have about the project that I can answer for you?

If leaving a message: I hope to hear from you soon so that I can answer any questions you might have. You can reach me at 785-532-_____. Thank you for your time.

Notes for researcher:

If agree to participate, schedule the interview:

- Name and email/phone number
- Type of interview preferred (video or telephone)
- Availability for interview

Follow-up Email Template

Dear Mr./Mrs./Dr. _____(Name),

Good morning, my name is _____. I work for the Center for Food Safety in Child Nutrition Programs, a center funded by the USDA Food and Nutrition Service Office of Food Safety and located at Kansas State University.

A few weeks ago, we sent an email inviting you to participate in one of our research projects. The purpose of the project is to identify current food defense practices in school nutrition programs. We are currently recruiting School Nutrition Directors or the person responsible for the School Nutrition Program to participate in a one-hour interview. Your school nutrition program was randomly selected to participate. The attachment contains additional information about the study.

Please reply to this email and let us know if we can count on you to participate. We want to schedule the interview as soon as possible within the next week or two. If you have questions, contact me at 785-532-5549 or Kerri Cole at 785-532-2211 who is also with the Center.

Thank you,

(Interviewer Name and Email Signature Line)