

# Reported Food Defense Measures Practiced in Schools in the United States: A National Survey

Carol J. Klitzke  
Apparel, Hospitality Management, and Education Studies  
Iowa State University

and

Catherine H. Strohbehm  
Apparel, Hospitality Management, and Education Studies  
Iowa State University

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## ABSTRACT

*Food defense is an emerging area of study of how to prevent intentional contamination of the food supply with chemicals or pathogens by someone with criminal intent. The topic of food defense in retail foodservices, particularly schools, has received limited investigation. This study will assess the risk perception of intentional food tampering of a national sample of school nutrition program directors and will determine the measures taken in school districts to mitigate the risk of intentional food contamination. Phase I of this study will consist of a Delphi panel of 10 to 15 school nutrition program directors representing four district sizes. Phase II of the study will consist of development and electronic distribution of a survey to a national sample of school nutrition program directors. Phase III of this study will consist of on-site observations of food defense practices in a small and a very large district in the Midwest.*

## INTRODUCTION

Much research about food safety has focused on how consumers and foodservice employees can protect food from unintentional bacterial contamination and growth. An emerging area of study is how to prevent the food supply from being *intentionally* contaminated with chemicals or pathogens by someone with terrorist or criminal intent.

Today's food supply is more centralized and more global than before (Khan, Swerdlow, & Juranek, 2001), meaning that fewer wholesalers supply more businesses and ingredients are sourced from around the world. Each country may have different standards with regards to food safety and inspections. In the U.S., mergers of food companies in the 1990's decreased the number of processing establishments, particularly in the meat and dairy industries (Wotecki & Kineman, 2003). This streamlining within the food supply market means more people will be affected by intentional contamination of even one ingredient of even one food product produced by even one supplier.

Although intentional food contamination remains rare, it does happen. Kennedy & Busta (2007) identified occurrences of 23 incidents of intentional food tampering from around the world between 1964 and 2006 and found these incidents resulted in more than 2500 illnesses and

91 deaths. Half of these events occurred since 2000, with six taking place in the United States (U.S.). School children were the victims in five of the events, although none of these incidents occurred in the U.S. While these figures are not significantly large, they do illustrate the trend toward crimes involving intentional food contamination and the lack of hesitation to target vulnerable populations.

It is estimated there are 76 million cases of foodborne illness in the U.S. each year (FDA, 2008); estimates are used because under reporting is a concern. Because most foodborne illnesses go unreported and uninvestigated, it's possible that intentional food tampering could actually be a more common cause of foodborne illness than is known. Illustrating this point is a study by Ashford, et al. (2003). This research team studied the causes of all worldwide disease outbreaks between 1988 to 1999 that were investigated by the Centers for Disease Control and Prevention's Epidemic Intelligence Service. Of 1099 investigations, 4 percent (n = 44) were caused by microbes considered to have high potential for bioterrorism agents; intentional contamination was considered a cause in six outbreaks.

Motives for those behind intentional food contamination include a desire to: create fear, bring attention to a cause, or weaken the government. In addition, intentional contamination methods and threats may be used to commit crimes such as murder, revenge, or extortion (Carus, 2009; Woteki & Kineman, 2003).

Because schools house a community's children on approximately half of the days of the year, intentional contamination of food served in a school would cause great fear, both locally and nationally (Greene, Barrios, Blair, & Kolbe, 2004). Schools receive support from local, state and federal governments and thus could be targets to those who want to cause distrust of the local government or cause social disruption. School districts with a single food production facility that prepares food for all the schools in the district (centralized foodservice) are especially vulnerable because all children in the district could be affected by one act of intentional contamination (Story, Sneed, Oakley, & Stretch, 2007).

Reports from the United States Department of Agriculture (USDA) show that on average, 11.1 million children eat breakfast and 31 million children consume lunch daily in over 101,000 schools across the nation (USDA Food and Nutrition Service, (n.d.), 2010). There is a need to investigate the food defense practices of schools because of the number of children eating school meals on a daily basis, and more importantly, because protection of our nation's future is paramount.

## **LITERATURE REVIEW**

In 2004, the USDA Food and Nutrition Service published a guide specifically for schools to help them plan and maintain food defense practices (USDA, 2004). Two studies of school foodservice food defense practices were found in the literature. Story, Sneed, Oakley, & Stretch (2007) conducted a survey of foodservice directors in the 200 largest U.S. school districts having central kitchens or warehouse distribution centers. Fewer than half of respondents reported the presence of written procedures for

- preventing intentional food tampering;
- requiring vendors to do criminal background checks of delivery personnel;

- including plans for communicating with food vendors in the district emergency preparedness plan;
- securing the facilities with guards or video cameras during off hours;
- asking delivery persons to show photo ID;
- posting delivery schedules;
- including emergency preparedness in employee orientation;
- maintaining access to staff lockers; or
- starting new employees on a day shift where they could be observed.

The authors concluded that a majority of these large centralized school foodservice operations did not have written plans for preventing food defense violations.

Yoon & Shanklin (2007) surveyed 782 foodservice directors in schools, hospitals, and long-term care facilities in Kansas. They achieved a 24.7% response rate (n=190), including 123 school foodservice directors. The results revealed that 10.6% of the school foodservice directors had attended a seminar or other training about food defense; more schools had an employee in charge of monitoring food safety (71.5%) than had an employee in charge of monitoring food defense (26%) (Yoon & Shanklin, 2007). Formal crisis management plans for the nutrition department were reported as in place by 35.8% of the school nutrition programs and 36.6% of the schools indicated there was a food defense plan.

## **METHOD**

This study will be conducted in three phases. Phase I of this study will consist of a Delphi panel with 2 nutrition program directors from each of seven geographic regions identified by the School Nutrition Association (the professional organization for school nutrition program staff). Directors will be selected to represent one of four district sizes (less than 2500 students, 2500-10,000 students, 10,000-50,000 students, and more than 50,000 students). The Delphi method was chosen because it allows input from experts across a wide geographical distance. Interaction among participants occurs, but without face-to-face interaction, removing some of the social barriers to giving genuine feedback.

This study will use a three-stage Delphi method. In the first stage the panel will receive open-ended questions regarding their perceptions of the risk of intentional contamination, the need for food defense practices, and the barriers to implementing food defense. For the second round, the panel will be given a list of strategies developed by experts that schools should employ as good food defense practices and asked to evaluate them according to importance and feasibility. In the third round the respondents will rank and rate each item again.

Phase II of the study will consist of development and electronic distribution of a survey to a national sample of school nutrition program directors. The survey will be developed following the guidelines of Creswell (2009) and Dillman (2008) using information learned in the Delphi process and a review of the literature. The survey will consist of three parts: perceptions of the risk of intentional food tampering in participants' districts (5-point rating scale); self-audit of identified food defense best practices used in their districts (Yes/No/NA), and demographics of the district and respondent (multiple choice and open-ended questions). Items for the food defense practices will be adapted from the instrument created by Yoon & Shanklin (2007), from

practices as identified in the Delphi panel, and from developed checklists (USDA, 2004; and Strohbehn, Sneed, Paez, & Beattie, 2007). Demographic characteristics of the district will include student enrollment, location, number of food production sites and average daily participation. Characteristics of the person in charge related to education level, experience and tenure at the district will be asked.

The survey will be pilot-tested for face validity with members of three standing committees of the School Nutrition Association: Research, Education, and Nutrition. The 30 total members of these three committees represent districts of all sizes from all regions of the U.S. The national sample will ensure equitable representation from school foodservice directors in districts located in all regions of the U.S.

Phase III of this study will consist of on-site observations of food defense practices in a convenience sample of one small and one very large district in the Midwest. The purpose of this final phase is to compare actual practice with stated practice of the selected respondents. Structured observation forms will be used to assess the validity of survey results.

### IMPLICATIONS

This information will help food safety experts to design educational efforts about school food defense and to target the training in regions or types of schools where it is most needed. The information gleaned could also have applications in other sectors of retail foodservices.

### REFERENCES

- Ashford, D.A., Kaiser, R.M., Bales, M.E., Shutt, K., Patrawalla, A., McShan, A., . . .  
Dannenberg, A.L. (2003). Planning against biological terrorism: Lessons from outbreak investigations. *Emerging Infectious Diseases*, 9, 515-519.
- Carus, W.S. (2009). Bioterrorism and biocrimes: The illicit use of biological agents since 1900. Retrieved from National Defense University website:  
<http://www.ndu.edu/WMDCenter/index.cfm?secID=187&pageID=27&type=section#Carus>
- Creswell, J.W. (2009). *Research design* (3rd ed.). Los Angeles: Sage.
- Dillman, D.A., Smyth, J.D., & Christian, L.M. (2008). *Internet, Mail, and Mixed-Mode Surveys: The Tailored Design Method* (3rd ed.). New York: Wiley.
- Food and Drug Administration. (2008). Foodborne illness-causing organisms in the U.S. - what you need to know. Retrieved from  
<http://www.fda.gov/Food/ResourcesForYou/Consumers/ucm103263.htm>
- Greene, B., Barrios, L.C., Blair, J.E., & Kolbe, L. (2004). Schools and terrorism: A supplement to the Report of the National Advisory Committee on Children and Terrorism. *Journal of School Health*, 74, 39-51.

- Kennedy, S.P., & Busta, F.F. (2007). In M.P. Doyle, & L.R. Beuchat (Eds.). *Food microbiology: fundamentals and frontiers* (3rd ed.). (pp.87-102). Washington, DC: ASM Press.
- Khan, A.S., Swerdlow, D.L., & Juranek, D.D. (2001). Precautions against biological and chemical terrorism directed at food and water supplies. *Public Health Reports, 116*, 3-116.
- Strohbehn, C.H., Sneed, J., Paez, P., & Beattie, S. (2007). *Food defense checklist for retail foodservices*. N3506. Ames, IA: Iowa State University Extension.
- Story, C., Sneed, J., Oakley, C. B., Stretch, T. (2007). Emergency preparedness needs assessment of centralized school foodservice and warehousing operations. *Journal of the American Dietetic Association, 107*, 2100-2104.
- United States Department of Agriculture. Food and Nutrition Service. (2004). *A biosecurity checklist for school foodservice programs: Developing a biosecurity management plan*. (FNS Publication 364). Retrieved from <http://healthymeals.nal.usda.gov/hsmrs/biosecurity.pdf>
- United States Department of Agriculture. Food and Nutrition Service. (n.d.) National School Lunch Program fact sheet . Retrieved from <http://www.fns.usda.gov/cnd/Lunch/AboutLunch/NSLPSFactSheet.pdf>
- United States Department of Agriculture Food and Nutrition Service. (2010). National School Breakfast Program fact sheet. Retrieved from <http://www.fns.usda.gov/cnd/Breakfast/AboutBFast/SBPFactSheet.pdf>
- Woteki, C.E., & Kineman, B. D. (2003). Challenges and approaches to reducing foodborne illness. *Annual Reviews of Nutrition, 23*, 314-44. doi: 10.1146/annurev.nutr.23.011702.073327
- Yoon, E., & Shanklin, C.W. (2007). Food security practice in Kansas schools and health care facilities. *Journal of the American Dietetic Association, 107*, 325-329.