

School Foodservice Directors' Attitudes and Perceived Challenges to Implementing Food Safety and HACCP Programs

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ABSTRACT

Food safety is an important part of providing school children with acceptable, safe, and nutritious meals. There is evidence that improvements are needed in the area of food safety in schools, and that few schools have implemented Hazard Analysis Critical Control Point (HACCP) programs. The purposes of this study were to determine the attitudes of school foodservice directors toward food safety and the use of HACCP programs in school foodservice and to identify the challenges to implementing food safety and HACCP programs.

A focus group was conducted to generate a list of challenges to implementing food safety and HACCP programs. As a result, a three-part written questionnaire was developed. For Part 1, school foodservice directors' attitudes toward food safety and HACCP programs were determined. For Part 2, the challenges to implementing food safety and HACCP were investigated. For Part 3, demographic information about directors and their districts was collected. Questionnaires were mailed to a randomly selected national sample of 800 district school foodservice directors. A total of 461 questionnaires were returned for a response rate of 58%.

Factor analysis was conducted on 11 attitude and 19 challenge statements to determine any underlying factors. The significant factors that emerged for the attitude scale were HACCP disadvantages, certification advantages, and certification disadvantages. Three significant factors emerged for the challenges scale: resource management, employee motivation, and employee confidence. Multiple regression analysis was used to determine relationships among variables.

The school foodservice directors responding to the questionnaire either did not perceive the challenges identified by the focus group as problematic in their district, or they were unsure if these challenges impacted their district. In general, the directors had a positive attitude about food safety and the use of HACCP programs in their districts. However, the majority (70%) of directors did not have a HACCP program in place, and many were unsure of what HACCP was or how to apply it in their operations. In response to an open-ended question about how food safety could be improved in their district, 29% of the directors indicated that they needed more time and 22% indicated that more money was needed for training. Other areas mentioned included improved employee attitudes and incentives, facilities/equipment modifications, increased staffing, and more training.

It is apparent that school foodservice directors need assistance in developing and implementing HACCP programs. Mentoring of younger school foodservice directors and providing HACCP resource materials would support HACCP implementation.

INTRODUCTION

The goal of the school foodservice program is to serve meals that are acceptable, safe, and nutritious (Neill, 1980). Food safety certification of employees and implementation of a Hazard Analysis Critical Control Point (HACCP) program are two ways to achieve these goals. Hwang, Almanza, and Nelson (2001) found that only 14% of Indiana school corporations had implemented HACCP programs and that 37% had no employees certified in food safety. The limited use of HACCP programs and the number of schools having no employees certified in food safety indicate that school foodservice directors may face challenges when implementing these programs.

The food safety certification process was initiated to establish minimum standards of food safety practices and provides information necessary to train employees in food safety and implement a food safety system (American Food Safety Institute, 2000). Several factors appear to limit the extent to which employees are certified.

Speer and Kane (1990) conducted research with state food protection directors in 50 states. They found that challenges to certifying employees were time, limited funds, and the perceived burden of certification. The rural nature of some states also presented a challenge to the certification process. Further, these directors stated that managers did not appear to be motivated to put food safety practices into effect, and believed that certification would not change these practices. However, a study by Penninger and Rodman (1984) found that certification of managers improved food safety practices in 20 foodservice facilities surveyed.

The success of a HACCP program also depends on the education and training of employees on the importance of their role in maintaining food safety. An understanding of HACCP and the related prerequisite programs, as well as a commitment from management, must be established to make HACCP successful (King, 1992). In their study of school foodservice in Indiana, Hwang et al. (2001) found that HACCP programs were more likely to be implemented in larger schools where the manager had food safety certification and sanitation-training programs were in place. They found that time, labor costs, and training funds were obstacles to implementing HACCP programs.

The attitude of foodservice employees toward food safety is critical to a successful food safety program. According to Howes, McEwen, Griffith, and Harris (1996), attitudes, knowledge, and monitoring are important factors for decreasing foodborne illness outbreaks.

Cochran-Yantis et al. (1996) studied the attitudes and knowledge of 300 restaurant operators that had favorable and unfavorable records of health inspections. They found that managers in restaurants with favorable health code records had a higher level of knowledge and a more positive attitude toward food safety than did managers in restaurants with unfavorable records.

Research shows that foodservice managers view food safety as important, yet they perceive a need for additional education in that area. Holdt (1992) found that, overall, managers of university foodservice operations rated food safety as an important job function and believed that learning more about food safety was worthwhile. Those managers with 11 or more years of foodservice experience demonstrated a more positive attitude toward food safety, compared to managers with less experience. Sneed and White (1993) found that school foodservice managers and directors/supervisors rated health and safety laws, inspection, and enforcement as high continuing education needs. Perceived needs for continuing education were positively correlated with education levels, as well as with years of "general" foodservice experience and "school" foodservice experience.

While it appears that school foodservice managers believe that food safety is important, there is evidence that improvements in food safety are needed and that HACCP is an area of confusion to many foodservice employees. Further, there are a limited number of current studies related to food safety and HACCP in school foodservice. The purposes of this study were to determine the attitudes of school foodservice directors toward food safety and the use of HACCP programs in school foodservice, and to identify the challenges to implementing food safety and HACCP programs.

METHODOLOGY

Questionnaire Development

Focus group. Twelve school foodservice directors in Silicon Valley, CA, who also were members of the Northern California School Food Service Association, were invited to attend a focus group. The purpose of this group was to develop a list of school foodservice directors' perceived challenges to implementing food safety and HACCP procedures in school kitchens. A set of questions was developed to guide the focus group discussion (Krueger, 1994; Krueger, 1998). During the two-hour session, participants identified challenges to implementing food safety and HACCP procedures. Ideas were recorded on note pads and the session was tape recorded and transcribed.

To ensure completeness and accuracy of the list of challenges, the list was mailed to a random sample of 15 school foodservice directors for review. This sub-sample was obtained from Market Data Retrieval's list of district school foodservice directors. Market Data Retrieval is a company that maintains national databases used for marketing purposes. Changes were made to the challenges based on feedback from these directors. This list was used to develop the challenges section of the written questionnaire.

Written questionnaire. A three-part written questionnaire was developed following the focus group. Section 1 of the questionnaire investigated school foodservice directors' attitudes toward food safety certification and HACCP programs. School foodservice directors were asked to indicate their level of agreement to the statements using a five-point rating scale (1=strongly agree to 5=strongly disagree).

Section 2 of the questionnaire investigated the challenges to implementing food safety and HACCP programs in school kitchens as perceived by school foodservice directors. This section

included the list of challenges generated by the focus group. A five-point rating scale (1=never a problem to 5=always a problem) was used for respondents to rate the level of impact of each challenge.

Section 3 of the questionnaire gathered demographic data about the school district and the school foodservice director. These data provided a description of the sample and were used to test relationships of demographic variables with attitudes and challenges variables.

The questionnaire was pilot-tested by 10 school foodservice directors. The random sample was chosen from school foodservice directors who were members of the Northern California School Food Service Association. The questionnaire and a cover letter explaining the purpose of the study were mailed to the school foodservice directors. The questionnaire was evaluated for clarity, appropriateness of content, ease of completion, and questionnaire length. Feedback from the pilot test was used to make revisions to the questionnaire. The research protocol and questionnaire were reviewed by the Institution Review Board for the Protection of Human Subjects at Oregon State University and was approved prior to data collection.

Study sample. A national random sample of district school foodservice directors was selected for the study. School foodservice directors who participated in the pilot test were not included in the study. The sample again was purchased from Market Data Retrieval. The total database for district school foodservice directors was 7,012. Eight hundred school foodservice directors were selected for the sample using simple random sampling. The sample size was calculated based on recommendations of Dillman (2000). He indicates that a population size of 6,000 and 8,000 requires 361 and 367 responses, respectively, for a $\pm 5\%$ sampling error. The researchers estimate that the response rate will be about 45%; thus, a sample size of 800 would be appropriate.

Data Collection

The following four-step procedure outlined for mail surveys by Dillman (2000) was used for the research:

- An advance-notice letter was mailed to the study sample.
- After one week, a cover letter, questionnaire, and business reply envelope were mailed. Each questionnaire had a three-digit code for follow-up purposes, and confidentiality was assured in the cover letter.
- After one week, a follow-up postcard was mailed.
- Three weeks after the second mailing, another cover letter, questionnaire, and business reply envelope were mailed.

Statistical Analysis

Data were analyzed using SPSS ver. 9. Frequencies, percentages, means, and standard deviations were calculated for all items on the attitudes and challenges to food safety and HACCP implementation scales. For demographic data, frequency of responses and percentages were calculated. A principal axis factor analysis with varimax orthogonal rotation was performed to determine dimensionality of items on the attitudes and challenges scales. Upon completion of the factor analysis, a Cronbach's alpha was calculated to estimate internal consistency for each factor identified for both scales. Multiple linear regression using the forward stepwise technique was

used to determine relationships among attitudes, challenges, and demographic variables. A probability of equal or less than 0.05 was used for all tests of significance.

RESULTS AND DISCUSSION

Focus Group

The focus group was held on a weekday morning and lasted approximately two hours. Five school foodservice directors attended. The mean school district size was 17,420 students. The school foodservice directors were employed in the foodservice industry for a mean of 18 years. The mean length of time the directors were employed in school foodservice was 14 years. The mean length of time the directors were employed in their current position was nine years.

The directors identified challenges to implementing food safety and HACCP procedures in school foodservice. Employee buy-in, employee motivation, training and education of employees, and employees' comfort level with food safety were regarded as essential to implementing successful food safety and HACCP programs. Further, the ability of school foodservice directors to find time to address food safety issues also was considered important.

Demographic Profile of the Survey Sample

A total of 461 of the 800 questionnaires mailed were returned, for a response rate of 58%. The majority (72%) of the school foodservice directors were between 36 and 55 years of age, and 83% were females. The majority (53%) of the school foodservice directors had some college education or a bachelor's degree. Approximately two-thirds (68%) of the directors had been employed 16 or more years in some segment of the foodservice industry, while 57% of the directors had 15 or fewer years of direct school foodservice experience.

More than one-half (59%) of the school foodservice directors responding were employed in school districts ranging in size from 1,001-5,000 students, and 82% of these districts used onsite foodservice production systems. The majority of school foodservice directors (70%) did not have a HACCP program established. The remaining foodservice directors either had developed or were in the process of developing a HACCP program in their school district.

Seventy-one percent of the school foodservice directors responding had earned some kind of food safety certification. This is higher than the 55% of Indiana school foodservice directors/managers who were food-safety certified (Hwang et al., 2001). This could be due to the fact that this study was conducted about two years later, and there has been an increased emphasis on food safety over that time. Half of these school foodservice directors (50%) obtained their food safety certification through the National Restaurant Association Educational Foundation's ServSafe(r) course.

Attitudes of school foodservice directors related to food safety and HACCP

implementation. Responses from the school foodservice directors to the attitude statements are represented in **Table 1**. The school foodservice directors were in positive agreement with the statements regarding the benefits of certification. They also were in positive agreement about the benefits of continuing education in food safety for themselves and their employees. However, they were neutral on the statement regarding the time and money required to certify employees.

Thus, time and money for food safety certification may not be major challenges in school foodservice.

Table 1. Attitudes of school foodservice directors (N=461) toward food safety and HACCP implementation

	Mean±SD ^a	1 ^b Strongly Agree	2 Agree	3 Neutral	4 Disagree	5 Strongly Disagree
Factor 1—Food Safety Education						
Checking on food safety is an important part of my job.	1.2±0.6	412 ^c (89.6)	32 (7.0)	8 (1.7)	2 (0.4)	6 (1.3)
Learning more about food safety issues is worthwhile.	1.2±0.6	378 (82.2)	67 (14.6)	8 (1.7)	1 (0.2)	6 (1.3)
Employee inservice training is an important way to improve safe food-handling practices among employees.	1.5±0.8	280 (61.1)	135 (29.5)	32 (7.0)	4 (0.9)	7 (1.5)
Factor 2—HACCP Disadvantages						
The use of a HACCP monitoring system is too costly to implement.	3.0±1.1	43 (9.7)	84 (19.0)	191 (43.1)	78 (17.6)	47 (10.6)
The use of a HACCP monitoring system is too time consuming to implement.	3.0±1.1	38 (8.6)	93 (21.1)	188 (42.7)	79 (18.0)	42 (9.5)
Factor 3—Certification Advantages						
Food safety certification of employees is a good way to make sure safe food is served.	1.7±0.9	246 (53.7)	126 (27.5)	65 (14.2)	15 (3.3)	6 (1.3)
Food safety certification of employees has made the food-handling practices in my facility better.	1.9±1.0	198 (44.9)	120 (27.2)	102 (23.1)	11 (2.5)	10 (2.3)
Factor 4—HACCP Advantages						
A HACCP monitoring system is important for maintaining an effective food safety system.	2.2±1.0	126 (28.6)	137 (31.1)	141 (32.0)	27 (6.1)	9 (2.0)
Creating and maintaining an effective HACCP monitoring system creates employee pride and self-esteem for a job well done.	2.4±0.9	89 (20.2)	121 (27.5)	198 (45.0)	27 (6.1)	5 (1.1)
Factor 5—Certification Disadvantages						
The time and money required to certify employees have not increased food safety practices.	3.4±1.2	34 (7.9)	62 (14.3)	121 (27.9)	111 (25.6)	105 (24.2)
Certification has not helped put safe food-handling practices into effect.	3.8±1.2	22 (5.0)	44 (10.0)	93 (21.2)	126 (28.7)	154 (35.1)

^aSD=Standard deviation
^bResponses were made using the scale, 1=strongly agree; 3=neutral; 5=strongly disagree
^cNumber responding (percentage)

These results are consistent with the findings of Sneed and White (1993) and Holdt (1992), whose studies found that directors/supervisors and managers rated continuing education in food safety as important. While Speer and Kane (1990) found that barriers to certification included time and money, they did not appear to be barriers for these respondents.

The directors' responses also varied regarding the use of HACCP programs. Again, the directors were in positive agreement with the statements regarding the benefits of HACCP. Statements addressing the time and money required to implement a HACCP program received neutral scores; thus, these factors do not appear to pose a major problem in HACCP implementation in school foodservice operations. This may be an inappropriate conclusion; however, as 70% of the directors have not implemented HACCP, they may have no idea about the time and cost

requirements. Further, many of the directors commented that they were unfamiliar with HACCP. Some directors reported that they would like to implement a HACCP program, but need additional resources to do so. These results are consistent with the analysis of King (1992), who stated that many foodservice operators are unfamiliar with HACCP or unclear about how to apply HACCP programs in their operation.

A principal axis factor analysis with varimax orthogonal rotation was performed on the items in the attitude scale. The five factors identified were: Factor 1=food safety education ($\alpha=0.80$); Factor 2=HACCP disadvantages ($\alpha=0.90$); Factor 3=certification advantages ($\alpha=0.79$); Factor 4=HACCP advantages ($\alpha=0.78$); and Factor 5=certification disadvantages ($\alpha=0.65$).

Multiple linear regression was performed with each of the factors on the attitude scale as a dependent variable. The independent variables were:

- district size;
- age;
- education level;
- years employed in foodservice;
- years employed in school foodservice; and
- food safety certification.

The model was significant ($p<0.05$) for Factors 2, 3, and 5. Food safety certification was significant for all three factors, and age was a significant for Factor 3 (**Table 2**). The independent variables accounted for a moderate amount of the variance (R^2) in the three factors: Factor 2=0.21; Factor 3=0.31; and Factor 5=0.26.

Table 2. Significant regression coefficients for the factors identified in the attitude scale						
		B	Std. Error	Beta	t	p
Factor 2—HACCP Disadvantages^a (N=363)	Constant	7.473	0.801	0.000	9.328	0.000
	Q40(cert.)	-0.731	0.241	-0.163	-3.034	0.003
Factor 3—Certification Advantages (N=366)	Constant	7.045	0.677	0.000	10.413	0.000
	Q32(age)	-0.498	0.130	-0.249	-3.863	0.000
	Q40(cert.)	-1.054	0.204	-0.268	-5.165	0.000
Factor 5—Certification Disadvantages (N=358)	Constant	7.458	0.813	0.000	9.177	0.000
	Q40(cert.)	-1.165	0.245	-0.252	-4.755	0.000

^aThe R^2 for the factors are: 0.21 (factor 2), 0.31 (factor 3), and 0.26 (factor 5)

The analysis for the attitude scale revealed that when school foodservice directors were certified, they did not view time and money as being disadvantages to employee certification and implementing HACCP programs in their district. Further, directors who were not certified portrayed a stronger attitude that certification did not improve employee food-handling practices.

Also, younger directors and those who were not certified agreed that improved food-handling practices were an advantage to employee certification.

Challenges to implementing HACCP programs. The responses of school foodservice directors to challenges to implementing food safety and HACCP programs are presented in **Table 3**. In general, the school foodservice directors were in agreement with the challenges identified by the focus group. The directors rated most of the statements at the middle range of the continuum of always a problem and never a problem. The statement that the school foodservice directors rated as being the most problematic in their district was that employees are nervous about taking the food safety exam. A related item, "employees do not feel comfortable with change," was rated as "sometimes a problem." The other item that earned a higher-than-neutral rating was "inadequate time for sanitation and safety courses and in-service training for employees." Thus, employee focus is the area that most needs to be addressed.

Table 3. School foodservice directors' (N=461) perceptions of challenges to implementing food safety and HACCP programs

	Mean±SD ^a	1 ^b Never a Problem	2	3	4	5 Always a Problem
Factor 1—Resource Management						
There is not enough time available to offer sanitation/ safety courses and inservices to employees.	3.2±1.4	76 (17.4)	66 (15.1)	98 (22.4)	108 (24.7)	89 (20.4)
Directors have little time to devote to food safety and HACCP monitoring system issues due to the daily operational pressures.	3.0±1.2	54 (12.0)	84 (18.7)	164 (36.4)	98 (21.8)	50 (11.1)
Employees need constant training and retraining in food safety issues.	2.9±1.3	77 (17.0)	106 (23.4)	104 (23.0)	106 (23.4)	60 (13.2)
There are not enough employees trained in food safety to train other employees.	2.9±1.3	76 (18.4)	83 (20.0)	117 (28.3)	88 (21.3)	50 (12.1)
The design of the facility places constraints on the extent to which food safety procedures can be developed.	2.7±1.2	93 (21.9)	90 (21.2)	129 (30.4)	76 (17.9)	37 (8.7)
Food safety and HACCP monitoring procedures have become routine for employees.	2.7±1.1	62 (15.5)	102 (25.4)	160 (39.9)	55 (13.7)	22 (5.5)
There is not adequate supervision to check that food safety procedures are followed.	2.6±1.3	99 (23.7)	106 (25.4)	97 (23.2)	81 (19.4)	35 (8.4)
There is not a standardized inspection process among sanitarians and county health departments.	2.4±1.4	165 (38.4)	79 (18.4)	82 (19.1)	50 (11.6)	54 (12.6)
There is a lack of support from the school district regarding food safety issues.	2.1±1.2	174 (43.7)	92 (23.1)	76 (19.1)	34 (8.5)	22 (5.5)
Factor 2—Employee Motivation						
There is a lack of support among employees to follow food safety and HACCP monitoring system procedures.	2.5±1.1	87 (19.4)	131 (29.2)	163 (36.4)	47 (10.5)	20 (4.5)
Employees do not recognize the food safety risks involved in not following food safety procedures.	2.4±1.2	120 (28.7)	138 (33.0)	71 (17.0)	73 (17.5)	16 (3.8)
Employees are not motivated about food safety issues.	2.4±1.1	99 (21.5)	173 (37.6)	112 (24.3)	63 (13.7)	13 (2.8)
There is a lack of support from employees, particularly from an employee who is a respected leader to follow food safety procedures.	2.2±1.1	147 (32.5)	146 (32.2)	117 (25.8)	27 (6.0)	16 (3.5)
Employees do not care a lot about food safety issues.	2.1±1.0	155 (33.8)	169 (36.8)	86 (18.7)	40 (8.7)	9 (2.0)
Factor 3—Employee Confidence						
Employees are nervous about taking the food safety certification exam.	3.6±1.2	26 ^c (5.8)	50 (11.1)	119 (26.4)	123 (27.3)	133 (29.5)
Employees do not feel comfortable with change.	3.4±1.1	27 (5.9)	78 (17.0)	133 (29.0)	135 (29.4)	86 (18.7)
Employees worry about losing their jobs if they fail the food safety certification exam.	2.9±1.3	79 (17.5)	76 (16.9)	149 (33.0)	91 (20.2)	56 (12.4)
Employees are uncomfortable with food safety issues because of a lack of education in this area.	2.4±1.1	94 (20.5)	170 (37.1)	118 (25.8)	61 (13.3)	15 (3.3)
Employees may feel uncomfortable with food safety issues due to language barriers.	2.0±1.2	230 (50.0)	88 (19.1)	79 (17.2)	42 (9.1)	21 (4.6)

^aSD=Standard deviation

^bResponses were made using the scale 1=never a problem to 5=always a problem

^cNumber responding (percentage)

A principal factor analysis with varimax orthogonal rotation was performed on the challenges scale. The three factors identified were: Factor 1=resource management ($\alpha=0.85$); Factor 2=employee motivation ($\alpha=0.86$); and Factor 3=employee food safety certification confidence ($\alpha=0.71$).

Multiple linear regression was performed for each factor on the challenges scale. The independent variables were:

- district size;
- age;
- education level;
- years employed in foodservice;
- years employed in school foodservice; and
- food safety certification.

The significant variables for the challenges scale are presented in **Table 4**. These variables accounted for a small percent of the variance in each factor.

Table 4. Significant regression coefficients for the factors identified from the challenges scale items						
		B	Std. Error	Beta	t	p
Factor 1—Resource Management^a (N=365)	Constant	25.632	2.783	0.000	9.211	0.000
	Q32(age)	-1.681	0.531	-0.205	-3.163	0.002
	Q33(edu.)	1.170	0.297	0.223	3.935	0.000
Factor 2—Employee Motivation (N=380)	Constant	12.013	1.642	0.000	7.315	0.000
	Q32(age)	-0.877	0.315	-0.181	-2.780	0.006
	Q33(edu.)	0.544	0.175	0.174	3.116	0.002
Factor 3—Employee Confidence (N=376)	Constant	13.433	1.526	0.000	8.809	0.000
	Q32(age)	-0.653	0.295	-0.141	-2.217	0.027
	Q33(edu.)	0.657	0.164	0.222	3.996	0.000
	Q38(dt. sz.)	0.916	0.356	0.141	2.571	0.011

^aThe R² for the factors are: 0.10 (factor 1), 0.08 (factor 2), and 0.12 (factor 3)

The analysis revealed that younger school foodservice directors and directors with more education perceived resource management and employee motivation to be more of a challenge to implementing food safety and HACCP procedures in their district than did other directors. Further, the directors perceived that the larger the district size, the less confident employees are about food safety.

These findings are consistent with the literature. According to Zuckerman (1988), a shortage of qualified foodservice employees makes following and monitoring food safety practices difficult. Also, the responsibility for monitoring food safety now is placed upon employees who are younger and less experienced than employees in the past.

Lipowski (1999) also reported similar findings. With the increase of retiring school foodservice directors in the year 2000, qualified potential directors willing to fill these positions have not been readily available. Therefore, future directors may not have adequate knowledge and skills related to food safety and HACCP programs.

Improving food safety. The school foodservice directors were asked to complete the following open-ended statement: "I could improve food safety in my district if...." Fifty-one percent of the directors who responded indicated that the greatest obstacles to improving food safety are time and money. This included lack of time for the directors to monitor food safety procedures and lack of funds to send employees to food safety training. Other challenges were reported, including:

- employee attitude;
- lack of adequate facilities;
- lack of staff;
- more time needed for employees to attend training;
- directors need more help;
- lower employee turnover;
- more money for training staff; and
- not having a HACCP program in place.

Challenges identified with this question were consistent with the challenges identified by the focus group.

CONCLUSIONS AND APPLICATION

The majority of school foodservice directors did not have a HACCP program in place, and many were unsure of what it was or how to apply HACCP principles to their operation. There appear to be challenges to implementing these programs, and efforts need to be made to overcome these challenges.

Resources on HACCP programs and their implementation in school foodservice clearly are needed. Information about HACCP needs to be better disseminated to school foodservice directors in a format that they can take and use. For example, sample standard operating procedures related to HACCP implementation could be developed and distributed. Model HACCP programs designed specifically for school foodservice would be useful resources. State agencies, the National Food Service Management Institute (NFSMI), and the American School Food Service Association could provide information. These resources should address the time and money challenges that school foodservice directors face.

Programs and materials related to HACCP need to be presented in a practical, realistic, and step-by-step manner. If school foodservice directors are expected to implement HACCP in its entirety, the process may be too overwhelming and may not occur. If a realistic timetable and process were developed, implementation could be facilitated.

Based on these results, it is apparent that younger and less-experienced school foodservice directors need assistance in handling the food safety challenges encountered in school foodservice. Younger directors were more likely to be college educated, which may mean they have a greater awareness of the need for implementing HACCP programs, although they may need technical assistance.

New directors should complete courses related to food safety and HACCP program implementation. A key focus area would be on motivating employees to follow standard operating procedures related to food safety. Additionally, mentoring of younger school foodservice directors by more experienced directors through networking at conferences, telephone calls, site visits, and other means would serve as a reference and support system for these directors. Foodservice directors need to be encouraged to participate in food safety courses that already exist. They need to be providing these programs to their employees, beginning when employees are hired.

The biggest challenges identified were items related to employee nervousness about taking food safety certification examinations and not feeling comfortable with change. Improving employees' confidence in their food safety knowledge and their ability to make changes is one area that school foodservice directors should focus attention. Training, supervision, and feedback all are strategies that might improve employee confidence and ability to implement HACCP programs. While these strategies are related to the time barrier that was identified, the time required to make these changes might be good investments in the long term.

Further, additional research needs to be conducted to determine models for HACCP implementation that are successful in school foodservice. More research on ways to overcome challenges also would be useful.

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